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The Marine Corps' Infantry Selection and Assignment Process: Is It Ready for Gender Neutrality?

by

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Opportunities for women in the military continue to expand. At some point in the future, the Marine Corps may be compelled to address the assimilation of women into combat arms occupational specialties. Existing high attrition rates in the Marine Corps' infantry specialties indicate a flawed selection and assignment process resulting in a poor fit of the person to the job. Because of gender differences, this problem will be magnified if women are incorporated into the infantry MOSs. This thesis identifies those gender differences and recommends predictors that could be used to better select personnel for the infantry military occupational specialties.

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ABSTRACT

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I. INTRODUCTION

A. PURPOSE

In its report to the President dated 15 November 1992 the Presidential Commission on the Assignment of Women in the Armed Forces, with ten members of the appointed panel voting for and two members abstaining, made the following recommendation:

> The sense of the Commission is that women should be excluded from direct land combat units and positions. Further, the Commission recommends that the existing service policies concerning direct land combat exclusions be codified. Service Secretaries shall recommend to the Congress which units and positions should fall under the land combat exclusions.

Over a year has passed since this recommendation was made and there is no legislation which would bar women from direct land combat by statute. The Commission also recommended service policies that prohibited women from flying combat aircraft be retained and the corresponding legal prohibition that was repealed in 1991 be reinstated. However, this recommendation was brushed aside by Secretary of Defense Les Aspin in April 1993 when he ordered the services to begin selecting and training women to fly combat aircraft. The same fate could befall the Commission's recommendation concerning women and direct ground combat at some future date.

The prevailing mood in the United States Marine Corps regarding women in direct combat roles is reflected by testimony given by Major General Gene A. Deegan on 25 June 1992 to the President's Commission on Assignment of Women in the Armed Forces.

> First, the combat restrictions should not be repealed. Second, it is pure lunacy to consider involuntary assignment of women to the infantry. The vast majority are physically incapable of such an assignment. An individual that advocates such a policy simply does not understand the rigors of close combat, the unique spirit required for success on the battlefield, and the physical limits of even the exceptional women that serve in our Corps today. Third, I am also opposed to the voluntary assignment of women as infantrymen. However, the rationale is much more difficult to articulate or quantitatively prove. I will admit up front that my position is based both on facts and gut feelings.

Currently, there is no "contingency plan" in the Marine Corps that addresses how women would be assimilated into combat arms occupational specialties should current policy be changed at some future point by administrative, legislative or judicial decree. Failure to plan for such a momentous reversal of policy could have as its end result a severe degradation of combat readiness in units that have previously been all male.

This thesis does not advocate assigning women to direct combat roles nor does it argue for the current policy ban to be maintained. It examines the history of women in the Marine Corps. It identifies factors that differentiate the two genders and discusses why these factors must be addressed. The Canadian model of integrating women into infantry units is

examined. Finally, the main thrust of the thesis is the construction of a framework, which emphasizes the optimization of combat readiness, for selection and assignment of women that could be implemented if the Marine Corps' infantry combat arms specialty is opened to women.

B. TIMELINESS AND RELEVANCE OF THIS STUDY

1. Background

The role of women in the armed forces of the United States of America is undergoing a period of dynamic change. Expansion of quantities of women serving and job opportunities available to them has flourished since the advent of the All Volunteer Force (AVF) in December 1973. In terms of quantities, the number of women in the armed forces has increased from less than 2 percent of the total force at the end of fiscal year, 1972 to 11.6 percent of the total force at the end of September 1992. (Presidential Commission Report, 1992, p.48). This numerical increase to a figure of 210,048 occurred in part because the services had difficulty recruiting qualified males and began recruiting more women rather than lowering standards in order to "qualify" more males (Holm, 1992, p.253).

Women have also seen their opportunity to serve in a wider variety of occupations increase significantly. During the last two decades the movement for equal rights for women and demands for equal opportunity in all fields in the

civilian sector have been paralleled in the armed forces. This was recently highlighted when Secretary of Defense Les Aspen announced on 28 April 1993 that the Department of Defense policy ban on women in combat aircraft would be lifted, effective on that date. He also announced that Congress would be asked to repeal the law prohibiting women from serving on Navy combatant ships. This culminated in the announcement that hundreds of women would begin serving aboard aircraft carriers in June 1994 (USA Today, December 2, 1993, p.4A). The only bastion yet to be scaled is the ban on women serving in ground combat roles, which involve seeking out, reconnoitering, and engaging the enemy in offensive actions.

Military members of the last generation would have been surprised if it had been possible to gaze into the future and see the advancements that military women have made since World War II. During World War II, at peak strength only 17,000 Women Army Corps members served overseas with the overwhelming majority being volunteers for assignment to duty outside the United States. Not until 1945 were women members of the Navy, Marines, and Coast Guard permitted to serve overseas and then only in certain American territories and not on foreign soil. At war's end, 4,000 WAVES and 1,000 women Marines were serving in Hawaii--all were volunteers. In 1948 the Armed Forces Integration Act limited the numbers of enlisted women in the military to 2 percent of enlisted strength. It also imposed a ceiling for women officers that

limited their promotional opportunity to Lieutenant Colonel in the Army, Air Force and Marine Corps or Commander in the Navy. Not until 1967 did Public Law 90-130 repeal the above limitations. In 1976, Public Law 94-106 opened up the service academies to women.

Women were first allowed to serve aboard naval ships in 1978 with the modification of Section 6015 of Title 10. Public Law 95-485 permitted women to be permanently assigned to ships not expected to be assigned combat missions, and also to be assigned for up to six months of temporary duty on other Navy ships.

In December 1989, 770 military women deployed to Panama in support of Operation Just Cause. During the operation, Army Captain Linda Bray led thirty soldiers of her 988th Military Police Company in a three-hour, infantry-style firefight. This led military sociologist Charles Moskos to state that Bray's command of troops in a combat operation in Panama was "a shot heard around the world, or at least in the Pentagon." Also during Operation JUST CAUSE two Army female helicopter pilots came under heavy fire while flying their Black Hawks and eventually received Air Medals with the "V" for valor.

As the scope of JUST CAUSE paled beside that of DESERT SHIELD/DESERT STORM so did the quantities of women deployed. During the United States campaign to rid Kuwait of the Iraqi army, 41,000 women, or more than 7 percent of American forces

in theater, were deployed in the country's largest scale operation since Vietnam. Women service members piloted helicopters over Iraq, directed Patriot missiles and loaded laser-guided bombs on combat aircraft. As well as guarding prisoners of war, American women were taken as prisoners of war by Iraqi forces. Noteworthy praise was given to the performance of women in DESERT STORM by high ranking American officials and military leaders.

> Women have made a major contribution to this war effort, said Secretary of Defense Dick Cheney when the Persian Gulf War was over. We could not have won without them. General H. Norman Schwarzkopf, the Coalition Forces commander, said they were magnificent.

2. Proponent Arguments for Women in Combat

The goal of the Defense Advisory Committee on Women in the Services (DACOWITS) continues to be that the Secretary of Defense and the services should have the flexibility to fully utilize all qualified personnel based on ability rather than gender (Holm, 1992, p.474). This goal requires that service members should be judged as individuals, not as blacks or whites, not as Hispanics or Jews and not as women or men regardless of job specialty. All people desiring to serve in any military specialty should be treated as individuals, not as members of a group. This equal opportunity concept for women to bear the hardships of war can be traced back to Plato who wrote about the "equality of women" in his Greek classic,

Republic. He argued that women should be expected to take their fair share of civic responsibilities and that men and women should receive the same education and share equally in all public duty. He further states that women who have the "right natural gifts" should not be debarred by difference of their gender from fulfilling the most important functions. Women "must have the same two branches of training for mind and body and also be taught the art of war , and they must receive the same treatment." When the state actually goes to battle, "men and women will take the field together."

One example of a woman who "took the field" with men in DESERT STORM is Major Rhonda Cornum, an army flight surgeon who was shot down during a helicopter rescue mission behind enemy lines. One of three survivors of the eight person crew, Major Cornum was taken prisoner by Iraqi forces and subsequently sexually molested. Major Cornum was eventually freed at the conclusion of hostilities. When asked for her opinion about women in combat she offered this as part of her statement for the record to the Presidential Commission on the Assignment of Women in the Armed Forces:

> A soldier needs physical and moral courage, ingenuity and integrity, determination and loyalty, a sense of humor, and of course luck, to be successful in combat. I do not believe and did not see any evidence that these qualities are distributed on the basis of gender.

Many groups are quick to point out that denial of combat billets to women severely impacts their promotional

opportunities. The percentage of women in the higher officer and enlisted ranks is disproportionate with the numbers of women in the military. There is more disparity if medical officers, which includes nurses, are excluded. The services maintain that the disparity exists because large numbers of women did not begin entering the military until the mid-1970s and that given time, the distribution of women at the higher ranks will begin to approximate that of men. But, if combat billets remained closed to women, there should continue to be a lower proportion of women in the senior officer and enlisted grades.

Sexual harassment, and in particular the gross abuses that occurred at the 1991 Tailhook convention, are being linked with the ban on women in combat units. Anna Quindlen, a New York Times columnist, wrote that "if you treat women like second-class citizens by denying them entrance to combat positions, your male personnel will get the idea that they can treat them like second-class citizens in other ways, too." This statement is striking in its similarity to that voiced by Representative Patricia Schroeder, a member of the House Armed Forces Committee, who said that the real lesson of the scandal was that "so long as women are excluded from combat roles and cannot participate as full partners they will be seen as second-class citizens." Retired Admiral Elmo Zumwalt known as the officer who broke the back of the Navy's race problem through aggressive actions in the 1970s echoed these same

statements during testimony for an Armed Services hearing in July 1992 when he insisted that the combat ban had helped shape the attitude of male service members toward women. Congressman Les Aspen reflected a similar attitude at these hearings when he said, "The combat arms are the essence of each service. The whole promotion system and prestige in the service is oriented to combat arms."

3. Public Opinion

Eitelberg writes "if there is to be any pressure on the military or Congress for widening the role of women, it would most likely come from sources external to the defense establishment--perhaps from public opinion or other social forces pushing for fair treatment and equal rights." (Eitelberg, 1990, p.24) In 1978, a Gallup poll found only 19 percent of survey respondents who felt that women should be eligible for combat roles (Gallup, 1979, p.150). In 1980, survey respondents answering the same question showed a marginal increase to 22 percent (Gallup, 1980, p.145). A poll conducted by the National Opinion Research Center in 1982 revealed that one of three respondents supported the use of women as soldiers in hand-to-hand combat (Davis et al,1982, p.35). A New York Times and CBS News poll conducted in 1990 asked the following question: "Do you think women should be allowed to serve in combat units if they want to, or don't you think so?" Of those surveyed, 72 percent said that women

should be allowed to serve in combat units (Sciolino, 1990, p.D.6). In 1992 the Roper Organization administered a survey called "Attitudes Regarding the Assignment of Women in the Armed Forces: The Public Perspective" and found the following results:

- 47 percent opposed the current military policy not to assign women to any direct combat positions.
- when asked whether women should be assigned to ground combat, 45 percent said only if they volunteer, 25 percent said women should be required to take the assignment, 27 percent said that women should not be assigned, and three percent did not know.
- 75 percent agreed with the statement "if a women meets the qualifications required by a direct combat assignment, the military should be able to assign her there." (Roper, 1992, p,27)

Survey results vary based upon such factors as timing and phrasing of the questions. However, there appears to be a noticeable shift among the American public over the past decade with increasing numbers of the population in favor of allowing women access to direct combat roles.

C. APPROACH

The selection and recruiting procedure that the Marine Corps currently uses to designate its recruits as 03s (infantrymen) is examined. Because physical differences between the two genders are frequently referenced as a primary reason that women are not allowed in combat arms specialties, these differences are discussed. Aggression is examined in

relation to any difference, real or perceived, between the male and female psyche. The cognitive predictor that the Marine Corps currently uses to assign enlistees to the infantry occupational specialties is identified.

The Canadian military was ordered to open all military occupational specialties to women in 1990. Success rates for women attending their infantry training schools have been very low. The Canadian model is examined for strengths and weaknesses in regards to the recruitment of women to attend basic infantry training, the selection process that was applied to the recruiting pool, and training that the women received prior to beginning infantry school. Last, attention is focused on training problem areas confronting women and leading to their attrition.

D. RESEARCH QUESTIONS

1. What are the differences between the "average" male and the "average" female that could impact combat readiness? How are Marine recruits selected and assigned to the infantry military occupational specialties? Should the Marine Corps adapt additional predictors for assigning recruits to infantry occupational specialties to reduce attrition?

2. What lessons in terms of recruiting, selection, and training can be gleaned from the Canadian model? What procedures should be ready for implementation to access women who have a valid possibility of meeting uniform standards into

the infantry field?

II. LITERATURE REVIEW

A. INTRODUCTION

This chapter provides a historical overview of the utilization of women in the Marine Corps as well as current Marine Corps' policy regarding classification and assignment of women. It will also address physiological and aggression level differences between the two genders. Also, the Canadian model of selecting, training and assimilating women into previously all-male units will be introduced.

B. WOMEN IN THE MARINE CORPS: HISTORICAL PERSPECTIVE

1. Pre-World War II

The first women to wear the Marine Globe and Anchor entered the Corps in 1918. This was necessitated because of high Marine casualties on the battlefields of Europe which caused a requirement for more combat personnel. Women were brought into the Corps to assume clerical jobs freeing male Marines to be assigned to combat. The 305 women who joined the Marines in August 1918 were nicknamed "Marinettes" a derivative of the Navy's term "Yoemanettes" for their female sailors. The "Yoemanettes" had entered the Navy in March of 1917 prior to the United States becoming involved in World War I. While the Department of the Navy authorized women in the Navy and the Marine Corps, the War Department determined that

the Army could not enlist women for any purpose other than as nurses.

With the end of World War I on 11 November 1918, the immediate demobilization of Navy and Marine Corps women began. By the end of 1919 there no longer remained any women on active-duty in the Marine Corps. In 1925 Congress changed the wording in the Naval Reserve Act of 1916, which had authorized enlisting "citizens" into the Navy and Marine Corps to now limit eligibility for military service to "male citizens." This restricted the Navy from enlisting women without prior approval from Congress.

This exclusion of women from the military continued until World War II when the issue was once again brought to the forefront as the services faced possible manpower shortages due to combat casualties. On 30 July 1942 Public Law 689 was signed authorizing the establishment of the Navy Women's Reserve and the Marine Corps Women's Reserve. The Navy women were to be identified as WAVES, an acronym for Women Accepted for Volunteer Emergency Service. Marine women were given no "nickname" and, as per the instructions of the Marine Commandant, Lieutenant General Thomas Holcomb, would be called "Marines." In November 1942 General Holcomb recommended to the Secretary of the Navy that "as many women as possible should be used in noncombat billets thus releasing a greater number of the limited manpower available for essential combat duty" (Marine Corps Women's Reserve in World

War II, 1968, p.3).

By May 1943 women Marine officers and enlisted personnel had completed training at Navy WAVE schools. In July 1943 the Marine Corps established the Women Reserve Schools at Camp Lejeune, North Carolina where over eighteen thousand enlisted women and 821 women officers were trained until the end of World War II. The first director of the Marine Women's Reserve, Colonel Ruth Cheney Streeter, was responsible for the successful integration of women Marines into more than 200 separate occupational specialties and billets at every major Marine Corps post in the continental United States (Heinl, 1977, p.243). But, not until the closing months of World War II were women Marines allowed to deploy "overseas" and were then assigned to the Hawaiian Islands.

At the close of the war General Holcomb gave women Marine's the credit for putting an entire Marine division in the field. Without women filling support roles stateside there would have been insufficient numbers of male Marines to form an extra division. At war's end, women Marines were filling 87 percent of the enlisted jobs at Headquarters, Marine Corps and comprised 33 to 50 percent of the troops at many Marine bases in the continental United States (Holm, p.101). Demobilization of the Marine Women's Reserve began shortly after the end of the war. By 1947 approximately 100 women Marines remained on active duty with all being assigned

to Marine Corps Headquarters.

2. The Women's Armed Services Integration Act of 1948

The Marine Corps showed no interest in maintaining large numbers of women on active duty in a peacetime environment. Marine Director of Plans and Policies Brigadier General Gerald C. Thomas stated in October of 1945 that "the opinion generally held by the Marine Corps is that women have no proper place or function in the regular service in peacetime. This opinion is shared with the Director of Marine Corps Women's Reserve (Colonel Ruth C. Streeter) and a majority of the Women Reserves." He further said that "the American tradition is that a women's place is in the home...women do not take kindly to military regimentation" and "during the war they have accepted the regulations imposed on them, but hereafter the problem of enforcing discipline alone would be a headache" (Stremlow, p.1). That "headache" became a reality on 12 June 1948 when President Truman signed Public Law 625, the Women's Armed Services Integration Act, which established a permanent place for women in the Army, Navy, Air Force and Marine Corps. While this law placed no limit on the number of women who could serve in the Reserves it limited the number of women in the Regular service branches to no more than two percent of each service. The Marine Corps was given a guideline for 1950 to not exceed 100 officers, 10 warrant officers and 1,000 enlisted women.

Public Law 625 was ambiguous concerning the role of women in combat and left to each Service secretary's discretion how women would be utilized. However, the intent of Congress was evident in the law's direction that in the case of the Navy and Air Force women "may not be assigned to duty in aircraft while such aircraft are engaged in combat missions; nor, in the case of the Navy may they be assigned to duty on vessels of the Navy except hospital ships and naval transports" (Holm, p.120).

Recruit training for Women Marines (WM's), their title as designated by a Marine Corps Memorandum dated 16 November 1948, was moved from Henderson Hall at Marine Corps Headquarters in Arlington, Virginia to Parris Island, South Carolina in January 1949. First Platoon of the 3d Recruit Training Battalion began training on 2 March 1949 and graduated on 12 April 1949. The platoon's drill instructors were three male Marines who provided instruction in close order drill, first aid, chemical warfare and the general orders. The first Women Officer Training Class graduated at Quantico, Virginia on 9 September 1949 with thirty-four women receiving their commissions of which seven were Regular commissions.

3. The Korean War and Pre-Vietnam Era (1951-1964)

At the beginning of the Korean War in July 1950 there were five hundred and eighty women Marines on active duty. In

order to free male Marines for combat roles this number significantly increased during the next two years and peaked at 2,787 in September 1953. After 1945 and prior to the Korean War, with the exception of two recruits who were assigned as photographers, all women Marines were assigned to administrative occupational fields. However, the requirement for women to be utilized in a wider range of billets was quickly recognized. In April 1952 after a study by the Procedures Analysis Office, military occupational specialties that were considered appropriate as well as unsuitable for women were promulgated and are detailed in Table 1. At the close of the war in July 1953 women Marines were again serving on most Marine posts in the continental United States and Pearl Harbor as well as being assigned European duty in Stuttgart, Germany. No women Marines, however, were assigned to Korea.

After the war, women continued to serve in the twenty-seven occupational fields opened during the war. But,the majority were concentrated in personnel administration (45-55 percent), supply, communications (telephone operators), disbursing, data processing, post exchange, and public information. In 1955, only 5 percent of enlisted women received formal training of any kind (Stremlow, p. 63). In 1963, 771 women completed recruit training but only five were sent to a service school. The remainder reported immediately to their permanent duty station. Women officers after

commissioning received a six-week Woman Officer Indoctrination Course compared to the male second lieutenant's nine-month training package at the Basic School. The fifties also saw the first women attend Drill Instructor's School at Parris Island. Five women completed the course in 1955 but were not allowed to carry a rifle during drill sessions. However, Headquarters Marine Corps, uneasy about a loss of femininity and image, nixed the idea and women did not return to the school for twenty-one years (Stremlow, p.118).

4. Vietnam Era (1964-1972)

In August 1964 Marine Commandant Wallace M. Greene ordered the creation of a study group to "propose a program to render the peacetime service of women Marines of optimum benefit to the Marine Corps" (Stremlow, p.71). This group became known as the Pepper Board named after its chairman, retired Lieutenant General Robert H. Pepper. Among its recommendations that were approved were women's assignment to a broader range of occupational fields to include drafting, lithography, operational communications, communications maintenance, auditing, finance, accounting, informational services, air control, and flight equipment. Women began receiving orders to service schools immediately after recruit training instead of proceeding to their permanent duty station.

With the advent of the Vietnam War and Congressional approval of a 30,000 increase in the Corps' end strength, numbers of women Marines began to increase. A peak of approximately 2700 women on active duty was reached in 1968 and 1969. In July 1966 a decision was made to assign women to the western Pacific to free men for combat duty and to provide women Marines with some career incentives. The first women Marines arrived on Okinawa in October 1966 and were followed at Iwakuni, Japan with another contingent in March 1967.

The most dramatic event of this period was the first assignment of a woman Marine to a combat theater which occurred on 18 March 1967. Master Sergeant Barbara J. Dulinsky was the first of thirty-seven women Marines (eight officers and twenty-nine enlisted) to serve in Vietnam from 1967-1973. Women Marines were carefully selected for Vietnam assignment and were in fact required to volunteer by notifying their commanding officer or by indicating the request on their fitness report. The women were assigned to fill desk billets at the Military Assistance Command based in Saigon. They worked with the Marine Corps Personnel Section on the staff of the Commander, Naval Forces, Vietnam and were tasked to provide administrative support for Marines in Vietnam. In contrast with the one year tour that male Marines fulfilled in Vietnam, women Marines were assigned to six-month tours and could volunteer for a six-month extension.

5. Early All-Volunteer Force Era (1973-1979)

The Navy and Marine Corps began to invest more time and resources in providing women with equal opportunity with the advent of the All-Volunteer Force (AVF) and demands from the national women's liberation movement. Also, many new occupational fields become available when in 1975 Marine Commandant General Louis H. Wilson approved the assignment of women to all occupational fields except infantry, artillery, armor and flight crews. Appendix C and D lists numbers and percentages of women Marines, officer and enlisted, and the military occupational specialties to which they were assigned in 1976.

6. The Eighties and Desert Shield/Desert Storm

In the 1980s women began receiving training at recruit depots involving participation in defensive combat operations. Also, women Marines began serving as members of Marine Security Guard detachments stationed at various embassies overseas. In 1984 the Commandant approved the results of the Women Review Board which focused on classification, assignment and deployability of women Marines. Those results included the establishment of the ideal enlisted women Marine strength at about 10,500 and that women would continue to serve in all major commands, both Fleet Marine Force and supporting establishments. Marine Corps Order (MCO) 1300.8P discussed in the next section was written as a result of this review.

During DESERT SHIELD/DESERT STORM, 2,178 women on active duty and ninety-eight women reservists deployed to the Persian Gulf. Women Marines served as administrators, air traffic controllers, logisticians, engineer equipment operators, communication center operators, radio technicians, supply administrators, drivers, military policemen and guards. Women Marine truck drivers operated in northern Saudi Arabia and some went into Kuwait to deliver supplies and transport enemy prisoners of war to holding facilities. In Motor Transportation Battalions, women Marines commanded companies and platoons. This first operational test of women Marine classification, assignment and deployment policies in an actual combat theater was termed an "unqualified success."

7. Current Policy

On 28 April 1993 Secretary of Defense Aspin announced a policy designed to open up more specialties and assignments to women in the armed forces. The new policy contained three elements. First, it opened combat aircraft to women. Second, it opened additional non-combatant ships to women and directed the Navy to prepare a proposal for Congress to remove the legislative ban on women serving on combatant ships. Third, it directed the Army and Marine Corps to review their assignment policies and identify more assignments that could be opened for women. As a result of this announcement, the Marine Corps began selection of candidates for flight training

based on a gender-neutral basis with men and women being assigned on a best qualified basis. All aircraft were open to women but assignment as forward air controller and battalion/regimental air officer remain closed to women (pilots) because of those individuals and units involvement in direct combat on the ground. Also, the Marine Corps opened seventeen ground military occupational specialties (Tables 2 and 3) and two units (Table 4) that were previously closed to women.

On 28 January 1994 Secretary of Defense Les Aspin announced new policy guidelines for assignment of women and a new definition of direct combat. Since President Clinton signed legislation repealing the law barring women from serving on combat ship in November 1993 and women can fly combat aircraft, the Risk Rule that barred women from serving in non-combat units where the risk was as great as that in combat units was deemed "overtaken by events." Thus, the Risk Rule was rescinded effective 1 October 1993. A new Department of Defense definition of direct ground combat was also issued. Direct ground combat was defined as having to meet all three of the following criteria: 1) engaging the enemy on the ground with weapons, 2) being exposed to hostile fire and 3) having a high probability of direct physical contact with the personnel of a hostile force. Women are prohibited in serving in units that engage in direct ground combat. With this policy announcement the Marine Corps began a review of

all military occupational specialties and units closed to women. These MOS's and units are listed in Tables 5 and 6.

Appendix E and F lists numbers and percentages of women Marines, both officer and enlisted, and the military occupational specialties to which they were assigned in January 1994.

C. WOMEN IN THE CANADIAN FORCES (CF)

1. Historical Perspective

Canadian women first entered the Canadian military as nurses in 1885 and served in the Canadian Northwest Rebellion, the Boer War and World War I. Their roles expanded in World War II as they served as anti-aircraft gunners, pilots, mechanics, and signallers (Canadian Mixed Gender Employment Leadership Guide, 1992, p.26). Based upon recommendations by the Royal Commission on the Status of Women convened by the Canadian government in 1971, CF employment policies were changed to include women in all occupations with the exception of near combat, isolated locations, and service at sea. This resulted in an increase from 19 percent to 66 percent of military occupations being open to women.

In 1978 the Canadian Human Rights Act prohibited discrimination in employment on the grounds of gender. It stated that "sex is not a permissible reason for discrimination unless it is based upon a bona fide occupational requirement" (Lamerson, 1989, p.2). This

resulted in the CF beginning an immediate investigation of the feasibility of employing women in non-traditional occupations from which they were previously excluded. A five-year trial known as Servicewomen in Non-Traditional Environments and Roles (SWINTER) was initiated to determine the operational impact of employing servicewomen in sea, land, and air near-combat units and at isolated locations. In 1986 after reviewing the SWINTER results the Chief of Defense opened an additional fourteen military occupations to women and opened several previously all-male units to servicewomen already employed in mixed-gender occupations. This brought the proportion of occupations in which women could be employed to 75 percent (Lamerson, p.2). The only areas remaining that were restricted to women were anti-submarine, fighter, and tactical helicopter squadrons in the Air Force; infantry, artillery, armored, field engineer, signal and field intelligence units in the Army; and destroyer and submarine fleets in the Navy. In February 1987, the Minister of National Defence announced plans to study these remaining areas that had remained closed to women.

A Director General of Combat-Related Employment of Women (CREW) was appointed to initiate activities and "to develop trial options with the objective of determining which single-gender units and military occupations could be opened to mixed-gender employment without reducing operational effectiveness" (Lamerson, 1989, p.3). Recruiting and training

for combat occupations comprised only 6 percent of the total recruit group, which was substantially lower than the 20 percent of applicants to the CF who are women.

Concurrent with the initialization of the CREW trials, the Canadian Human Rights Commission formed a tribunal to determine if the trials were legal and constitutional. The tribunal began its deliberations in May 1988 and passed its judgement in February 1989. That judgment decreed "that the employment of women in combat occupations should not be a trial, but should be a policy decision" (Lamerson, 1989, p.3). Thus, the CF emphasis changed from measuring the impact of mixed-gender combat units on combat readiness to one of facilitating a smooth and positive integration of women into those same units. Currently, all Canadian Force occupations and areas of employment, except submarines, are open to women.

2. SWINTER Trials

The SWINTER trials began in November 1979 and ended in October 1985. The primary purpose of the trials was to identify the social-psychological lessons resulting from introduction of women into previously all-male, military operational environments (Park, 1986, p.3). Servicewomen were assigned duties in four operational areas that had previously been closed to women. These included field service support to primary land combat operation units stationed in Europe, service at sea aboard a non-combatant ship, support to a

primary land combat operation units stationed in Europe, service at sea aboard a non-combatant ship, support to a communications station located aboard the Arctic Circle and as aircrew at transport or transport and rescue squadrons (Park, 1986, p.1). The focus of this section will be on the service support units assigned to land combat operations hereafter referred to as "Land Trials."

Women involved in the Land Trial tests were assigned to a Field Ambulance Battalion and a Service Battalion. Both units provided direct support to a Combat Mechanized Brigade Group, which was tasked to act as a blocking force in event of enemy breakthrough in the German area of operations. Women assigned to the two battalions varied in representation between 6 and 15 percent of each unit. The women involved, ranging in rank from private to Captain, were expected to perform the same combat-related duties as the men. All women posted to the Land Trial Battalions were volunteers and were required to complete attitudinal surveys prior to assignment. These surveys were designed to obtain information regarding the women's personal backgrounds, career and organizational commitments, and attitudes toward SWINTER and women's roles, in general.

A comparison of the volunteers' surveys with those who declined to participate in the trials revealed that the volunteers tended to be different from their non-volunteer counterparts. Servicewomen who volunteered were more

approving of women's involvement in the military and expressed greater support for "traditional" military values such as putting operational concerns ahead of one's personal life. For example, the non-volunteers were three times more likely than the volunteers to indicate that they "would probably refuse or try to avoid going into combat" (Park, 1985, p.70). While volunteer servicewomen most frequently cited the opportunity to do something different as their primary motivation for accepting a Land Trial posting, they were also firm in proclaiming that they were not out to open up new employment for women.

The only physical requirement was that the women had to be at least five feet two inches tall and weigh at least 127 pounds. The rationale for these selection standards was to ensure that women had sufficient muscle mass to physically perform field tasks. However, the standards did not include aerobic fitness or a height/weight ratio and some women were posted who were obese and/or not physically fit (Park, 1985, p.7).

During the trial period, the Canadian Forces Personnel Applied Research Unit (CFPARU) in conjunction with on-site Social/Behavioral Sciences Advisors (SSBA) prepared research reports documenting specific data collected as part of the evaluation. Also, key personnel such as commanding officers and immediate supervisors assessed the women's performance using operational criteria. At a minimum, semi-annual reports

documenting the progress of the Land Trials were submitted by the SBSA throughout the trial period.

At the conclusion of the Land Trial tests a content analysis of interview comments suggested that a "functional, yet somewhat guarded, mutual acceptance" had developed between the men and woman of the two trial units. A slight majority (56 percent) of the male respondents and most female (74 percent) gave positive assessments of servicewomen's performance and impact (Park, 1985, p. 22). Women appeared to have been integrated more satisfactorily into the Ambulance Battalion than into the Service Battalion. That unit's emphasis on medical skills vice physical strength appeared to better facilitate the women's integration. In the Service Battalion the inability of certain women to cope physically was seen as a continuing obstacle to women being fully accepted. Other factors inhibiting their acceptance were their lacking the necessary training and motivation for land field posting and a reluctance on the part of the men to accept the idea of women as combatants.

Overall, SSBA used two criteria to judge the success of servicemen's and servicewomen's social integration. First, did the men demonstrate acceptance of women both in their survey answers and in their behavior toward women or did they attempt to keep women segregated? Second, did the women perceive that they had been fully integrated into their units and did they fully participate in unit taskings and

activities? The SBS concluded that the groups did not achieve a satisfactory social integration. At best the conclusion was that women were "accommodated not accepted" (Park, 1985, p.39). Their findings pointed to three primary sources hindering complete and satisfactory integration. These include: 1) servicewomen's selection and training for field duties; 2) servicemen's unfamiliarity with and resistance to accepting women in previously all-male, combat roles; 3) and, organizational factors precluding or limiting integration efforts (Park, 1985, p.41).

Regarding the selection and training of women for field duties Park notes:

> Certain servicewomen were faulted for their lack of physical strength, disinterest in field duties, and/or inadequate tactical motivation. These three problem areas reflect deficiencies in the women's selection and training for field duty. Women's physical inability to handle all field tasks provoked the greatest tension between men and women, and represented the major obstacle to women's acceptance. Specific tasks (i.e.,lifting stretchers int o an ambulance, loading and unloading full propane bottles, setting up a kitchen truck, and carrying boxes of ammunition) requiring lifting or carrying were repeatedly cited as being beyond the capability of most women in their respective trades. Whereas some women performed most capably, other women took additional time to complete tasks, or "discriminating leadership" was shown in which supervisors ensured that the weaker women were paired with strong men. Servicemen were not pleased with either solution and argued that preferential treatment was being shown (Park, 1985, p.42).

Previous studies (Amir, 1969) have proposed that when integrating a minority group with a dominant group the minority group will face difficulty being accepted if they do

not have equal status on variables that are important with the dominant group (Park, 1985, p.42). Thus, men who consider physical strength to be an essential factor in field operations were not sympathetic with servicewomen who argued that they could use alternate strategies to accomplish the task or that they were among the top performers in their specialty. The servicewomen themselves acknowledged that "the bigger women are more capable and stand a better chance of surviving." Park concludes that the physical standards used to screen women for the land trial were not adequate and that the integration attempt would have had a better chance of success if the two genders had been on more equal footing.

The evaluation also identified that some of the servicewomen exhibited a distaste or disinterest in field duties, which impacted the overall acceptance of women. A significantly larger number of women than men (70 vs. 20 percent) stated that they had not expected field life to be as it was (Park, 1985, p.44). Park states that a more stringent screening of applicants, both male and female, wishing to join the Canadian Forces could minimize the number of individuals not inclined to serve in the field.

In conclusion, the SBS adopted the following policy recommendations pertaining to selection and training of women into non-traditional positions/mixed-gender units:

a. The socialization of women to prepare them for employment in the land environment must begin at the

recruitment stage. This preparation should include informing potential applicants of their liability for serving in field units. Advertising designed to attract civilian women to apply, and information provided at Canadian Force Recruiting Centers, should follow the "realistic expectations" approach. As a result, individual women having little inclination for such employment may well exclude themselves from applying to the Canadian Forces.

b. The principle of preparedness through proper selection applies also to the implementation of realistic and appropriate physical selection standards. This method of ensuring that all personnel selected for a given trade are largely capable of performing static Base as well as field tasks would allow for the formation of a mutual trust and acceptance as equal.

c. Additional environmental and fitness training may be necessary for both servicemen and servicewomen. Such training would be particularly important during the initial stage of their career to prepare them more completely for later duties and to allow them to assume all assigned trade tasks in various environments. This recommendation is consistent with existing policy in which individuals throughout their careers are tested and identified as requiring remedial fitness training. Other such programs might be necessary. (Park, 1985, p.54)

3. CREW Trials

Approval for the CREW trials was granted in June 1987. It was directed that the trials consist of comparisons between mixed-gender and single gender (male) combat units in the infantry, artillery, armor, signals and field engineers. The primary issue was whether the integration of the two genders would effect a unit's ability to perform its mission. If decrements were identified in the performance of the mixed-gender units, a secondary issue was if the decrease in efficiency was due to the mixed-gender composition of the unit. Measurement of unit effectiveness was the target of the trials not measurements of individual skills.

The trial plan outlined the following guidelines in order to ensure there was a sound operational and scientific basis for the trial: 1) all participants would meet the same enrollment standards and receive identical training , 2) women would be posted to units in sufficient numbers to provide each other social support and also have a clear impact on the unit as a whole, 3) sufficient time would be necessary to conduct an evaluation, and 4) more than one training cycle per unit would be needed for observations (Lamerson, 1989, pp. 1-2). The plan allowed for a one year integration phase after training and then a two year evaluation phase. Data collection for the trials included field observation, recording of archival data, assessment by the chain of command as well as questionnaires and interviews.

Recruiting and training for the trials began in April 1987. Female applicants numbered only 6 percent for combat occupations, which was significantly lower than the 20 percent of applicants to the Canadian Force who are women. This served to slow the process and prior to the evaluation phase beginning, the Canadian Human Rights Commission in February 1989 ruled against the trials and for immediate integration of women into combat occupations.

D. PHYSIOLOGICAL GENDER DIFFERENCES

1. Body Composition

Body composition and size have a significant impact on the performance of physically demanding tasks. The body is composed of non-fat and fat tissue mass. Non-fat mass is made up of skeletal and smooth muscle mass. That which is not muscle mass is known as body fat and is measured as a percent of body weight (percent body fat) or as a mass (body fat in pounds). Table 7 compares 1984 military recruits and reveals that the average female recruit is 4.8 inches shorter, weighs 31.7 pounds less, and has 37.4 pounds less muscle mass and 5.7 pounds more fat mass than the average male recruit (Presidential Commission, 1992, App.C p.3).

Similar results were found by Fitzgerald in 1986 and Vogel in 1992. Their data revealed that the average female soldier weighs 20 percent less than the average male soldier, has 10 percent more body fat and 30 percent less muscle mass (Sharp, 1993, p.3). Because an individual's body composition and size affect fitness and physical performance, the average female is at an inherent disadvantage in performing demanding physical tasks when compared with the average male. The female's larger quantity of body fat does not contribute directly toward muscular activity. Additional fat can be likened to "dead weight" and can be compared to carrying excess baggage. This, combined with a concurrent lower muscle

mass, places women at a distinct disadvantage when performing military tasks requiring muscular strength.

Table 8 illustrates the correlation between physical performance and body composition. There is a positive correlation between aerobic activities such as the two mile run and body fat percentage (higher body fat percentage correlates with slower two mile run times). There is also a positive correlation between strength activities and fat free mass (ability to lift greater weight correlates with higher percentage of fat free mass). Because women have more body fat and less muscle mass they are more likely to have slower run times and lower strength levels (Sharp, 1993, p.4).

2. Muscular Strength

Strength is defined as the maximal force a muscle or muscle group can generate at a specified velocity (Sharp, 1993, p. 4). The maximal force produced at zero velocity is defined as <u>isometric strength</u>. This contrasts with <u>dynamic strength</u>, which is maximal torque exerted against a resistance to include isokinetic (controlled velocity) and isotonic (uncontrolled velocity) strength.

In terms of isometric strength, women produce 60 to 70 percent of the isometric force of men (Knapik, 1980, p. 1086). There is a greater isometric strength disparity in the ratio of upper body strength (.6) than lower body strength (.67) when comparing women with men. This correlates with the

female-to-male ratio of muscle mass which is .65 for the legs and .59 for the arms (Sharp, 1993, p.5).

Studies show that while the average female is not as strong as the average male, some women are stronger than some men. This is illustrated by Figure 1 and is even more evident in Figures 2 and 3 when strength is measured relative to body weight and fat-free weight. As Figure 3 shows, the results are most similar when strength is corrected for differences in muscle mass. This supports the conclusion that there is a similar ability of muscles to produce force between the genders but the quantity of muscle mass available to produce force differs.

Dynamic measurements of strength are often more highly correlated with job performance than measures of isometric strength (Sharp, 1993, p.6). Tests given to measure dynamic strength range from lifting, pressing or pulling a maximum amount of weight on a weight machine to lifting a maximally-loaded box from floor to shoulder height. A United States Navy study with the results shown in Figure 4 revealed that the dynamic strength of women ranged from 46 to 58 percent that of men (Presidential Commission, 1992, Appendix C, p.4). This supports the results shown in Figure 5, which illustrate that the female-to-male strength ratio for a maximal lift on a weight stack machine is .50. This strength differential lowers when women were asked to raise a maximally-loaded box from the floor to shoulder height. In this dynamic strength

test women were able to lift .60 as much as men (Sharp,1993,p.6). Sharp writes that it takes two women to do the work of one man in terms of single measures of maximum strength. This has been demonstrated with both a college and an Army population group. In a college age sample the isokinetic strength of two women was 101% that of one man (Sharp, 1992, p.2). In a sample of Army soldiers, the dynamic lifting strength of two women was 114% that of one male soldier (Sharp, 1992, p.2).

3. Muscular Endurance

Muscular endurance is defined as the ability to maintain an isometric contraction, or to perform repeated submaximal dynamic contractions at a specified percentage of maximal strength (Sharp, 1992, p.2). An example of muscular endurance would be continual loading of a fifty-pound ammunition box into a truck at a proscribed rate. When exercising at a given percentage of their maximal strength, females demonstrate equal or greater endurance than male exercising at a given percentage of their maximal strength. For example, the average women lifting a box requiring 30 percent of her max strength will maintain power output as long or longer than a man lifting a box requiring 30 percent of his max strength. The disparity in muscular endurance arises when women have to use a greater percentage of their maximum strength than the average man. The fifty-pound box will cause

a women to work at a greater percentage of her strength capacity than an average man lifting the same box. This results with women becoming fatigued faster than men when handling a same weight load.

4. Cardiopulmonary Capacity

An individual's maximal aerobic power has a direct effect on the capacity to perform physical activity over an extended period of time. Maximum aerobic power is measured as maximal oxygen intake (also known as VO_2max), which is defined as the highest rate at which the body can utilize oxygen. High VO_2max measurements correlate with an individual's ability to sustain submaximal exercise lasting longer than five minutes. This measurement can be taken during physical activity such as running, forced marching, cycling, and swimming. VO_2max differences between the genders is caused due to women having a smaller heart mass, smaller heart volume, lower cardiac output and lower hemoglobin levels than men.

> Women have 6 percent fewer red blood cells and 10 to 14 percent less hemoglobin than men. The increased hemoglobin concentration in men enables them to circulate more oxygen per unit of blood. There are also differences in a woman's capacity to pump blood through the system. A woman's maximum cardiac output , or the quantity of blood pumped by the heart per minute, is 30 percent less than a man's cardiac output. Cardiac output is determined by two factors: stroke volume and heart rate. Stroke volume is the quantity of blood pushed out of the heart with each beat. Women have a smaller heart and heart volume than men. Because stroke volume limits cardiac output, a woman's heart rate will be higher than a man's

> heart rate at any given cardiac output. In order to maintain an equivalent supply of oxygen to working muscles, a woman must increase her cardiac output to make up for a decreased oxygen capacity (i.e., a lower hemoglobin content)(Sharp, 1993, p.11).

Also, the difference in each gender's fat-free mass and body fat impact aerobic capacity. The combination of the above results in women having a lower capacity than men to perform aerobic exercise at a set rate. This is true whether expressed in absolute terms (.71), relative to body weight (.73) or relative to fat free mass (.88) (Sharp, 1992, p.3). For example, during a constant-paced forced march women would exercise at a higher percentage of their aerobic power, generate greater increases in heart rate, oxygen intake and heat production, which would result in faster fatigue and a greater risk of heat injury than men. (Sharp, 1993, p.10).

E. PERSONALITY GENDER DIFFERENCES (AGGRESSION)

1. Definition and Overview

Prior to the mid-1970s studies abounded concerning the supposed aggression level differences between the genders. The overwhelming majority of those studies indicated that in every society in which men and women differ in aggressiveness, men are more aggressive (Tavris, 1977, p.54). Several of the studies will be encapsuled with attention directed toward gender aggression differences among children and adults and why there is a variance in aggression levels. For the

purposes of this paper aggression is defined as actions that are intended to cause injury (Nicholson, 1984, p. 159).

2. Aggression Level Differences Among Children

Many studies show that males of all ages engage in more physical aggression, fantasy aggression, verbal aggression and play aggression than females (Tavris, 1977, p.54). This behavioral sex difference is found in a variety of cultures (Maccoby, 1974, p.228). A cross-cultural work reported in 1974 detailed behavior observations in six cultures (Kenya, Okinawa, Philippines, India, Mexico, and the United States) with the subjects divided into two age cohorts, children from three to six and children from six to ten. In all cultures and both age groups, boys engaged in more "mock fighting" (rough and tumble play), exchanged more verbal insults and were more likely than girls to counterattack if aggressed against in either verbal or physical form (Maccoby, 1974, p.228).

A similar study conducted by Omark, Omark, and Edelman involved playground observation of 950 subjects ages four through ten in the United States, Ethiopia, and Switzerland. A greater incidence of aggressive behavior defined as hitting or pushing without smiling was found among boys in all three societies (Maccoby, 1974, p.228).

These studies are indicative of a group of observational studies reported on between 1967 and 1973. Of

fourteen studies only one found girls to exhibit higher observations of aggression (Maccoby, 1974, p. 230). This study, done by Blurton Jones, was conducted with twenty-five subjects ages three and four with frequencies of rough and tumble and aggressive play being recorded (Maccoby, 1974, p.415). Blurton Jones reported that his results appeared to be atypical and upon doing further observations with a larger sample, but which included the original twenty-five children, the usual higher level of aggression in boys was found (Maccoby, 1974, p.228).

Experimental studies involve the research scientist confronting subjects with tasks in a sterile setting as opposed to observational studies, which are pure observations of unelicited behavior in a natural setting. Results found in experimental studies are very similar to those found in observational studies. Of nineteen studies reported on between 1967 and 1973 involving children ages three to eleven, only two registered any indication that girls behaved more aggressively than boys. The majority found boys to exhibit higher levels of aggression. A representative study was one conducted using a film that shows an adult attacking an inflatable doll and being praised for his or her actions (Hicks, 1968, pp.303-309). The children were then sent to an experimental room where they were given similar inflatable dolls. In these circumstances the boys tend to punch the doll five times more than the girls.

Another way of measuring aggressive tendencies is by asking children what they think instead of observing their normal and coerced actions. Rating scales and questionnaires are used to identify any differences between the sexes. In nine studies that included self-reports and interviews with parents and teachers, eight found that boys appeared to be more aggressive than girls, two reported no difference, and none found that girls were more aggressive than boys (Maccoby, 1974, p. 233). Typical of results found with these studies are the findings of Walker who utilized a rating scale with teachers, subjects and their peers to measure temperament traits. 450 children age eight to eleven were used as subjects. The children rated themselves on ninety-six self-descriptive statements--sixteen for each of the following traits: energetic, surgent, social, stable, fearful and aggression. The results were that teachers viewed boys and boys viewed themselves as more aggressive and energetic and as less fearful than girls (Maccoby, 1974, p.610).

3. Aggression Level Differences Among Adults

Measurements of aggression among adults has been accomplished through experimental studies and with questionnaires. As with children, the preponderance of the studies lead one to conclude that males are the more aggressive of the two genders. The majority of the experimental studies with adults involved the administration

of "shock" to a confederate in a laboratory setting. An experiment conducted by Shuck in 1971 is representative of other studies. Shuck measured sex differences in aggressive behavior of forty college age subjects subsequent to listening to a radio broadcast of violence. The subjects were asked to shock a confederate when a wrong answer was given in a learning experiment. Men administered higher levels of shock than women (Shuck, 1971, pp.921-926). This validated a similar study conducted in 1965 that also dealt with the administration of shock to a confederate who made an incorrect response in a learning task. Forty college-age students were used as subjects. As with the Shuck study, men delivered higher intensities of shock than women (Epstein, 1965, pp. 585-589). Of the thirteen experimental studies reported between 1965 and 1973 involving subjects age eighteen and over, men exhibited more aggression in nine of the studies, no difference was ascertainable in three of studies, and women demonstrated a higher aggression level in one of the studies (Maccoby, 1974, pp. 232-233).

Similar to the results of questionnaires administered to children, adult males see themselves as much more aggressive than women (Nicholson, 1984, p.163). A study conducted by Wagman measured sex differences in types of daydreams involving 206 college age adults. Men reported a higher frequency of aggressive, hostile and heroic daydreams than women, while women reported a higher frequency of

passive, practical and planning daydreams than men (Wagman, 1967, pp. 329-332). Projective tests have also been used to compare aggression levels of the genders. The premise of this type test is that the feelings one ascribes to others reflects how the man or women feels. An example is a group of subjects being shown a picture of a motorist getting out of a car that has just crashed into the motorist's car. The subjects are asked what the motorist is about to say. On all these tests men emerge as significantly more aggressive than women (Nicholson, 1984, p.166).

More recently during Desert Shield in December 1990, men were evenly divided on whether to attack Iraqi forces in Kuwait (48 percent both for and against). However, women opposed military action by 73 to 22 percent. A similar gap existed during the air phase of Desert Storm. Men approved the tactic by fifty-seven to forty percent while women decisively opposed air strikes by sixty-three to twenty-nine percent (Howes, 1993, p.28).

Real-life or observational studies testing the belief that men are more aggressive than women are limited. Available studies tend to support the idea. Group violence, whether on the streets of large cities or in sporting events deemed "violent" such as football, is basically a masculine event (Nicholson, 1984, p.166). Also, crime statistics can be cited to advance the theory that the genders differ in aggression levels. In virtually all societies where

statistics are kept, male participation in violent crime exceeds that of females on the order of 9:1, which implies much higher levels of aggression for men (Hooker, 1989, p.50).

4. Biological Foundation for Gender Aggression Differences

The findings that males are more aggressive than females has not been well-received by some groups. They argue that the studies are inconclusive because young women in America are taught to inhibit aggressive behavior while male aggressive behavior is reinforced. Essentially these groups attribute any supposed difference in gender aggression to learned behavior, and suggest that what is learned can be modified. Maccoby, while not denying the environmental effects on aggression differences, traces the differences to a biological foundation.

> Let us outline the reasons why biological sex differences appear to be involved in aggression: (1) Males are more aggressive than females in all human societies for which evidence is available. (2) The sex differences are found in early life, at a time when there is no evidence that differential socialization pressures have been brought to bear by adults to "shape" aggression differently in the two sexes. (3) Similar sex differences are found in man and subhuman primates. (4) Aggression is related to levels of sex hormones, and can be changed by experimental administration of these hormones. (Maccoby, 1974, pp. 242-243)

Maccoby gives examples of prenatal females who are exposed to abnormally high levels of male hormones being "masculinized" both physically and behaviorally. This happened with humans

when genetic feamles received excessive amounts of male hormones prenatally due to abnormal activity of the fetus's adrenal glands or when there was injection of male hormones to the mother during pregnancy. With animals, it was shown that introduction of testosterone to female rodents increased their aggression level in adulthood. Maccoby also cites a study in which female rhesus monkeys were administered testosterone and became more aggressive than male monkeys who were untreated. Before the testosterone was introduced, the male monkeys had been more dominant and aggressive than the females.

Maccoby writes that it is highly likely that there is a biological component underlying sex differences in aggression, but like all behavior, aggression is subject to social shaping and undergoes successive modification through learning (Maccoby and Jacklin, 1980, p.964). She also states in her earlier work that "in almost every group that has been observed there are some women who are fully as aggressive as the men." (Maccoby, 1974, p.247) However, she feels that though there are many myths about sex differences, the strong link between aggressive behavior and sex represents an exception in the spectrum of psychological differences (Maccoby and Jacklin, 1980, p.977).

F. SUMMARY

This chapter has traced the ever expanding role of women and their contributions to the Marine Corps from World War I

to the present. It has also examined literature that discusses gender differences from a physical and aggression level perspective. Canadian experience involving problems generated when women enter previously non-traditional jobs has also been reviewed. Though women have made tremendous strides in the military, American females may face their toughest challenge when tasked to assimilate into infantry positions, which demand high states of physical readiness and a personality conducive to "seeking out, closing with and destroying the enemy."

III. SELECTION AND ASSIGNMENT: THE ARMY, ASVAB, AND CANADIAN FORCE EXPERIENCE

A. INTRODUCTION

This chapter focuses on the importance of selection and assignment of personnel who have a high probability of job success in specific occupational specialties. In the 1980s the United States Army conducted a study involving necessary strength requirements for groupings of job specialties. Its objective was to match the job with a person physically qualified to meet the job's physical requirements. This study and its results, which became known as the Military Entrance Physical Strength Capacity Test (MEPSCAT), will be reviewed. Also, a Center for Naval Analysis study that identified the best cognitive predictor of success in the infantry field using a particular section of the ASVAB test will be discussed. Last, the Canadian model involving how the Canadian Forces assimilated women into their infantry will be analyzed. This model provides an excellent insight into problem areas that can be expected unless appropriate selection and assignment criteria are established before assimilation of women into infantry occupational specialties.

B. THE IMPORTANCE OF THE SELECTION PROCESS

1. Overview

Selection is the process of choosing for employment a subset of applicants available for hire (Muchinsky, 1993, p.141). Selection is based upon the premise that some applicants are "better" suited for a particular job than others. Matching these individuals to employer vacancies will lead to better organizational efficiency and a more satisfied employee. Selection decisions can be evaluated from both institutional and individual perspectives. Institutional criteria relate to how the hiring decision ultimately affects the organization and is measured by increases in productivity, reduced costs, or combat readiness for military units. Individual criteria relate to how the hiring decision affects the individual and is measured by feelings of accomplishment and personal satisfaction. Hired applicants are judged to have a higher probability of job success based upon their meeting certain predictors that the organization has established. These predictors are variables such as tests or interviews that have been designed to correlate with the actual job criterion. For example, a certain score on a college entrance exam is used as a predictor for academic mastery at the collegiate level, which is the criterion. Predictors must be both reliable and valid. When predictors have been established, the selection process can begin

choosing the "right people" which will benefit the organization and those selected personnel who have the attributes to pursue their "right career."

C. UNITED STATES ARMY ATTEMPTS TO IMPROVE SELECTION/ASSIGNMENT

1. Overview

A Government Accounting Office (GAO) study published in 1976 involving the utilization of women in the military revealed that some women were having difficulties with physical tasks in some assigned specialties. This resulted in higher than expected attrition rates for women because of job dissatisfaction and reassignment of women to administrative jobs. At this point, the Army screening procedure involved the Armed Services Vocational Aptitude Battery (ASVAB), a medical examination, and a written questionnaire regarding moral qualification. This information was then used for MOS assignment. The GAO recommended strength testing of recruits to allow recruiters to "match the right person with the right job." The Army realized the benefit of a physical predictor that could be used to reduce injury-related costs and reduce costs of retraining soldiers not physically capable of meeting job requirements for their chosen MOS.

In 1977 the Exercise Physiology Division of the United States Army Institute of Environmental Medicine (USARIEM) was tasked by the Army Deputy Chief of Staff for Personnel,

through the Surgeon General's Office, "to develop, a battery of physical fitness tests suitable for screening new accessions for MOS classification" (Teves et al, 1985, p.iii). The USARIEM is the Army Surgeon General's medical research and development laboratory responsible for examining the physical fitness needs of the Army (Pentagram, July 19, 1984, p.28). The study was conducted from 1978 through 1980 in response to the tasking, and recommendations were submitted in September 1980. No action was taken at that time due to a perceived adverse impact on personnel utilization. In 1982, the USARIEM was again tasked to "develop and validate a gender-free military enlistment physical strength capacity test" (Teves et al, 1985, p.iii). This study, which became known as the Military Entrance Physical Strength Capacity Test (MEPSCAT), is detailed in the following sections.

2. The Military Entrance Physical Strength Capacity Test

The goal of the study that began in 1978 was to develop valid screening procedures that were safe and easily administered as well as not racially or sexually biased for physically demanding jobs. The first step in the process was to do a task analysis of the job that was designed to identify the limiting tasks or requirements of the job. Task analyses are conducted through surveys, interviews, and observation of personnel who are currently doing the job as well as surveys and interviews with their supervisors. The USARIEM conducted

the task analysis by surveying and interviewing MOS training school instructors to define and quantify the physical demands of the 351 Army MOSs. Resulting from this analysis was a classification system that considered aerobic capacity and muscle strength requirements of the job. Aerobic capacity and strength requirements were then divided into high, medium and low categories. Then, all MOSs were grouped into five clusters based upon strength and aerobic demands of the specific MOS. These clusters with physical requirements are depicted in Table 9.

Further studies were conducted in the 1978-1980 period to develop predictive tests for aerobic and lifting capacity. At Fort Jackson, South Carolina, a project used an interrupted treadmill test to measure VO^2max or aerobic capacity. This was then compared with a multiple regression equation using a submaximal heart rate multiple step test, gender and percent body fat. A squared multiple regression correlation coefficient (R^2) of .84 was obtained when using these three variables compared with the actual VO^2max measurement obtained with the treadmill test (Teves et al, 1985, p.6). Because the step test required special equipment and time to conduct, it was deleted from the equation with a resulting decrease of only .02 in R^2. This was interpreted to mean that gender and body fat measurements would give a good estimate of actual aerobic capacity.

At Fort Stewart, Georgia a project was undertaken to

identify a predictor for lifting capacity. The criterion task was the lift of a steel box to a platform 132 centimeters high. Weight was added after each successful lift until the subjects were unable to complete the lift. Then, six isometric strength tests were administered to the same subjects. The final multiple regression equation for predicting lifting capacity included lean body mass, isometric upright pull strength and gender. This was compared with the the strength criterion task that had been measured by the steel box lift. An R^2 of .62 was produced (Teves et al, 1985, p. 7). This was interpreted to mean that an equation using lean body mass, isometric upright pull strength, and gender could be used to estimate an individual's strength capacity.

Because of these studies, it was recommended that a skinfold test to measure body fat composition and an isometric lifting test be implemented as part of the screening process at Military Enlisted Processing Stations (MEPS). This, together with the MOS clusters, could be used for selection and assignment. However, due to uncertainties of the impact on manpower of any physical classification system, a decision on implementation was deferred (Teves et al, 1985, p.7).

In 1981, the pressure to match individual soldier capacity with job demand resurfaced with the creation of the Women in the Army Policy Review Group (WITA). WITA disregarded the USARIEM classification system shown in Table 9 and selected a modified Department of Labor (DOL)

classification that divided jobs, based on physical requirements, into five categories. These categories are depicted in Table 10. This classification system is based entirely on lifting capacity and does not consider aerobic requirements. USARIEM was again tasked by the Office of the Deputy Chief of Staff to repeat the selection and validation of a strength capacity screening procedure based on the Army modified DOL classification system.

Five items were considered in the attempt to identify the best predictor for lifting capacity to meet job criteria. These were:

- an exercise heart rate bench stepping test;
- a skinfold determination of percent body fat and lean body mass;
- an isometric 38 centimeter (15 inches) upright pull force to measure static lifting strength;
- an isometric handgrip force that is indicative of whole body strength; and
- a Maximal Incremental Lift to 152 centimeters (60 inches) and 183 centimeters (72 inches).

The study was conducted in three phases. Phase I was administered to 980 men and 1004 women recruits at Fort Jackson, South Carolina in September and October 1982 immediately before the beginning of Basic Training. Phase II retested 89 men and 113 women of the original group in November 1982 during the last week of Basic Training. Phase III was administered to 466 men and 487 women of the original

group from January to March 1983 toward the end of their Advanced Individual Training. During Phase III a series of generic criterion performance tasks including lifting, pushing, pulling, carrying and twisting tests was administered to the same soldiers. These were designed to represent the physical demands of the MOS categories. The descriptive data gathered in Phase I were then used to predict performance on these criterion performance tasks. As a result, the ARIEM found the incremental dynamic lift (IDL) to be the best predictor of physical strength capacity required for performance of the MOS-related job tasks (Pentagram, July 19, 1984, p.28). The IDL required lifting a weight on a machine to a height of sixty inches. This was deemed equivalent of lifting a box onto the bed of a two and one/half ton truck.

An independent civilian agency, the Advanced Research Resources Organization of Bethesda, Maryland concluded that the MEPSCAT was a valid predictor of performance on physically demanding tasks (Myers et al, 1984. p.viii).

3. MEPS Utilization of MEPSCAT

The Military Enlisted Processing Stations began requiring applicants to take the MEPSCAT during in-processing in 1984. At the MEPS, the lift was first demonstrated by the recruiter. Then the applicant attempted to lift forty pounds to a set mark in one continuous motion. (The lift is analogous to the military press except that the lift stops at

shoulder height for an individual sixty-seven to sixty-nine inches tall). Weight was then added in increments of ten pounds until the lift could not be negotiated and the test was stopped. The last weight lifted successfully was assigned as the final score. The highest weight any applicant could attempt was 110 pounds.

The physical demands classification shown in Table 10 was further grouped into only two categories--a light and heavy cluster. The light cluster of jobs entail lifting seventy pounds or less and the heavy cluster requires lifting eighty or more pounds. The infantry MOS was classified as a heavy cluster job. If an individual was unable to lift eighty pounds but wanted an MOS in the "heavy" cluster of jobs, a waiver could be granted. Inability to lift forty pounds was not a disqualifier for enlistment. The MEPSCAT, together with the ASVAB, was used by recruiters to match recruits to the MOS for which they had the strength and cognitive ability to succeed.

4. Abandonment of MEPSCAT

The Army's original intent was to use MEPSCAT as a selection and assignment tool. However, it proved to be very unpopular with the Army Recruiting Command because it added additional hurdles for recruiters to overcome to recruit enlistees. For example, 84 percent of the enlisted positions available were classified in the heavy MOS cluster (Teves et

al, 1985, p.53). In the period between January and July 1983 when 99 percent of males qualified for the "heavy" MOSs, only 21 percent of the females qualified for the heavy cluster. One-half of the females who qualified for heavy MOSs chose a light cluster MOS. Of the females unable to lift eighty pounds, 22 percent were granted a waiver to enter a "heavy" MOS. With strict adherence to standards, the overwhelming majority of women in the Army would be concentrated in a fraction of the job specialties. Thus, the Army stopped using the MEPSCAT for assignment and instead used it only as a recruiting counseling tool.

In 1990 the MEPSCAT was eliminated altogether. In testimony before the Commission on the Assignment of Women in the Armed Forces on 6 April 1992 Colonel Dennis Kowal, Command Psychologist for the United States Army Intelligence Command, stated it was eliminated for political reasons (Commission, 1992, App.C, p.13). In testimony before the same Commission on 7 August 1992 Dr. James Vogel, Director of the Occupational Health and Performance Directorate, USARIEM, stated its demise was caused by a disagreement about whether standards should reflect peacetime or wartime requirements (Commission, 1992, App.C, p.13). Sharp states in a 1993 report that the test's effectiveness was never determined and it was dropped as a cost-cutting measure (Sharp, 1993, p.19).

D. VALIDATION OF ASVAB AGAINST INFANTRY JOB PERFORMANCE

1. Overview

In 1981 a joint-service Job Performance Measurement (JPM) was initiated to link military aptitude requirements to objective measures of job performance (Mayberry, 1990, p.-v-).

Hands-on performance tests (HOPTs) that required examinee's to perform critical job tasks were used to measure job performance. The Center for Naval Analysis (CNA) examined the validity of the Armed Services Vocational Services Battery (ASVAB) and composites of the ASVAB against infantry performance measures that were collected as part of the JPM. The following sections describe the ASVAB, the CNA analysis, and the linkage that was found between a particular composite of the ASVAB with hands-on performance of critical infantry tasks.

2. The ASVAB

The ASVAB is used by the armed services to identify students who potentially qualify for entry into the military and for assignment to military occupations (ASVAB Counselor Manuel, 1989, p.2). It consists of ten subtests that are listed and briefly described in Table 11. The Marine Corps uses a summation of the Word Knowledge (WK), Paragraph Comprehension (PC), Arithmetic Reasoning (AR) and Auto/Shop Information (AS) scores to form a composite known as the General Technical (GT) score which is used as a qualifier for

assignment into infantry occupational specialties.

3. Conduct of the Analysis

Over 2100 Marines in infantry specific MOSs participated in the test (Table 12). The sample was stratified by rank, educational level and length of service to ensure appropriate representation of the infantry population.

Individual Training Standards (ITS), developed by the Training Department, Headquarters, Marine Corps, are used as the primary source for job tasks that define the infantry MOS. Because of time, resource, and personnel constraints, an objective sampling procedure was used for the CNA test. Hands-on tests were chosen which would be representative of a Marine's ability to perform all infantry tasks based on his performance on the subset of the ITS. These tests were selected and refined by Marine Corps' job experts who ensured that the test content represented infantry specialties as a whole and was consistent with what is required on the job and in combat.

Because the tests required a subjective judgement of whether an individual performed a particular action, the most critical component of the testing was the test administrator. Retired Marine Corps staff-noncommissioned officers and officers were chosen as the test administrators and trained for two weeks in how to score the tests to ensure test validity. Quality control measures were also used to

guarantee standardized scoring. These measures included multiple-administrator scoring of examinee performance, daily computerized entry of performance data to check for administrator leniency or drift and test administrator rotation across testing stations to minimize systematic error (Mayberry, 1990, p.4).

The tests included a core set of infantry tasks such as preparing a M203 grenade launcher for firing, assembling and operating a PRC-77 radio, and installing a Claymore mine. Also, unique tasks to a particular specialty were tested. Examples of these are machinegunners preparing range cards for the Mk 19 machinegun, mortarmen laying the 81mm mortar, and riflemen firing the M16A2 rifle on a pop-up, quick response range. Each hands-on test required approximately eight hours to complete.

4. Test Results

Table 13 shows the validity of different ASVAB composites against infantry performance measures using hands-on performance tests. The Mechanical Maintenance (MM) composite score that consists of the summation of the AR, EI, MC and AS scores proved to have higher validity than the GT composite in four of the five infantry specialties. In these four MOSs, MM validitys were four or more points better than GT validitys. This improvement of over 7 percent was considered substantial enough for CNA to conclude that "the

Marine Corps could benefit by revising its composite used for infantry classification." (Mayberry, 1990, p.26)

E. THE CANADIAN MODEL

1. Overview

The Canadian Forces' planned assimilation of women into all military units was helped along by their Human Rights Tribunal decision in February 1989. This decision ordered that "full integration is to take place with all due speed for both active and reserve force with complete integration except submarines within the next ten years." Because the Canadian Forces was given a ten-year period, the decision was made to begin assimilating women on a "unit by unit" basis vice integrating women into all units at a designated juncture. The following sections identify how women were selected to enter the Canadian infantry and discuss their training at recruit training and infantry battle schools. It identifies problems that women confronted at the battle schools and concludes with recommendations made by the Director General, Combat Related Employment of Women concerning how to improve women infantry recruit success rates.

2. Selection Process

Canadian recruits are processed for military service at Canadian Force Recruiting Centers (CFRCs). The accepted applicant also receives assignment to a particular occupational field at the CFRC. Assignment is made after the

recruit has taken an aptitude test, passed a medical exam, and been interviewed by an officer at the recruiting center. The cognitive test is similar to the ASVAB in that it provides composite scores for different areas of aptitude. To qualify for assignment to an infantry specialty, the recruit must attain a minimum set score on the arithmetic and automotive information categories of the test. Once this score is attained and the recruit is certified medically sound, the recruiting officer meets with the recruit. After an interview, the officer assigns the recruit to his/her specialty choice or informs the recruit that another specialty would be better suited for that particular individual. After assignment, a CF 283 is compiled on each recruit. This provides a history of the recruit to include medical category, test scores, a military potential rating, and narrative comments on family, education, work, activities, military occupation choices, and a summary of the counseling the recruit has received.

3. Initial Recruit Training

This initial period of training conducted at Canadian Forces Recruiting Schools (CFRS) can be correlated with training received by Marine recruits at the Parris Island and San Diego Recruit Depots. Canadian recruits are segregated into units by gender and are exposed to different levels of physical training. As at Marine recruit depots, these units consist of individuals who will enter a wide range of

occupational specialties after graduation from recruit training. Though the women who will attend infantry battle schools have been designated before beginning this initial training, these women are required to meet only the female physical standards, which are lower than the standards for the male recruits. After completion of CFRS, recruits designated to enter infantry training proceed to battle schools for infantry specific training.

4. Infantry Battle Schools

Infantry battle schools for regular duty forces are located at Cornwallis and St. Jean. The schools are twelve weeks in length and entail rigorous training involving infantry fighting skills. Physical training, including two road marches of ten miles each, did not change with the entry of women into the programs. The culmination of training is a five to eight day field exercise involving detailed exposure to field conditions involving "combat" scenarios. The last twenty-eight hours at St. Jean involve trainees carrying forty-five pound rucksacks, moving continually and getting minimal sleep.

In the first two-year period following the opening of the infantry occupational field to women, training failure rates were very high. Of the eighty women assigned the infantry specialty, 32 percent were released from the CF while at recruit school, 18 percent were released while at Battle

School and 44 percent were reassigned for failure to meet the Battle School's standards during two attempts at training (Munro, 1989, p.2).

Women, an identifiable group, failed to achieve an established minimum standard that 70 to 75 percent of another identifiable group, men, were meeting. This problem with female attrition was attributed to one or a combination of three factors. These are: 1) a problem in the characteristics of the identifiable group not meeting standards, 2) a problem in the training of the identifiable group and/or 3) a problem in the selection criteria for the identifiable group.

The most frequently cited reason for female attrition at the Battle Schools was failure to meet physical fitness standards. Also cited in order of occurrence as reasons that females did not finish training were medical disqualification, lack of motivation, stress-related incidents, and aggression both lack of and too much. Because of the high rate of attrition, a study was conducted to identify any characteristics common to those females who have come closest to finishing training. The study's secondary aim was to make recommendations that might enable females to achieve greater success in infantry training. Its tertiary aim was to identify predictors that recruiting centers could use in the selection process before assignment into the infantry field.

The study was begun with a review of CF 283, the Applicant's Assessment file, which was prepared at the CFRC.

Then, interviews were conducted with females and males who had attrited from Battle School training. Last, interviews were conducted with the Battle School training staff.

Many women who were interviewed did not feel they were properly briefed at the recruiting centers regarding the physical and emotional rigors that would confront them at the Battle School. A large proportion felt the video tape that was shown at the recruiting centers was not realistic in its portrayal of Battle School. Most did not list infantry as their first choice for a military occupation. Of those who did, a percentage did so because they were frustrated with the long wait to begin training for their actual first choice. Others felt they were offered infantry because of the need for female recruits to further Combat Related Employment of Women (CREW) testing. A majority of the women voiced displeasure that the physical training received at CFRS did not adequately prepare them for the physical challenges that immediately confronted them at the beginning of Battle School. Many of these recruits stated that they arrived at the Battle School at a lower physical conditioning level than male recruits. This caused them to feel "left behind" both physically and psychologically, which resulted in their low motivation and subsequent failure. The women who were meeting Battle School physical standards but attrited for other reasons also cited physical reasons as the major problem confronting women. These women who were meeting physical standards were failing

to complete the training cycle for medical reasons or for lack of motivation. Of those cited for lack of motivation, the reason most frequently stated was that this was caused by a lack of peer support. Because males saw the majority of females failing to attain set physical standards, the women who were meeting those standards felt that the males were grouping all females together as physically unfit.

Males who did not finish Battle School training were also asked about why females were having such a difficult time completing the cycle. The most commonly cited reasons were poor physical condition, lack of motivation, poor life preparation and a lack of aggressiveness.

The Battle School staff was also interviewed concerning their perceptions on why females were not completing the training program. The large majority stated the lack of physical endurance or conditioning evident in the female recruits. This was attributed to a failure of the CFRS for not adequately preparing female recruits by not allowing them to do the same physical training as male recruits. Others cited poor medical screening as the main reason for females failing. Another reason cited was inadequate counseling and information received by the female recruits at the CFRCs, which contributed to them arriving at the Battle Schools poorly prepared, both mentally and physically.

Because of this and further analysis, the Director General of Combat Related Employment of Women (DGCREW) issued

the following remarks and recommendations.

(1) Women of small physical stature and poor levels of physical conditioning skills are being assigned into infantry occupations. These women have no chance to succeed in training because they cannot perform the tasks set in training even with extra physical training. A recruiting and training system that would be fairer to female recruits must begin with the recruiting staffs. Recruiters must be made aware of the difficulties female recruits are having in meeting the physically-demanding training requirements of the infantry. Only women who are in top physical shape have any hope of finishing infantry training. DGCREW recommended that the Director, Recruiting Services together with DCREW issue an instruction to CFRCs providing general guidance on how to assess military potential for infantry recruits.

(2) When there are only two or three women in a unit of twenty to thirty, group cohesion is achieved at the cost of excluding the women. When numbers of women are increased this does not occur as frequently. Groups of six or more women per serial are needed to provide psychologically important groups for mutual support during training. Beginning in Recruit School female infantry recruits, when there are ten or more, should be grouped together into designated mixed-gender serials. DGCREW recommended that a plan be developed to direct those women selected by recruiters as suitable infantry recruit candidates to the designated serials to achieve some semblance

of supportive group dynamics.

(3) The initial entry recruit schools have different physical standards for males and females designed to improve their level of physical fitness. These have not led to training or employment difficulties in occupations other than infantry. However, the Infantry Battle Schools expect all recruits to be at the male recruit level of performance upon arriving at the Battle School and then quickly move to a higher level of performance. Ability to do well on the obstacle course, to do pushups, sit-ups, and chin-ups, and to move quickly on foot in formation under the weight of personal equipment are essential to the development of the mental and physical agility, strength and stamina required for combat. Few women arrive at the Battle Schools able to perform at the same physical level as men resulting in most ceasing training within the first weeks of Battle School training. DGCREW recommended that female infantry recruits be required to pass the male physical fitness standard at Canadian Force Recruiting Schools to enhance their chance of success at the Infantry Battle Schools.

F. SUMMARY

This chapter identified the importance of the selection and assignment process in placing job applicants in job specialties where they can attain job specific criteria and standards. This "fit" contributes both to unit efficiency and

reinforces an individual's self-satisfaction with the job. The attempt made by the Army in the 1980s to use a physical strength test as an aid in selection and assignment was reviewed. Also, use of the ASVAB's MM composite score as the best predictor to gauge an individual's capability to effectively meet infantry training standards as measured by hands-on testing was identified. Last, the attempt by the Canadian Forces to assimilate women into the Canadian infantry and the resulting problems, which can be traced to deficient selection and assignment guidelines, were highlighted.

IV. SELECTION AND ASSIGNMENT: MARINE CORPS PERSPECTIVE

A. INTRODUCTION

The focus in this chapter is on the selection and assignment process from a Marine Corps' perspective. The chapter identifies a current problem that could intensify with assimilation of women into infantry MOSs and concludes with strategies that could be utilized to confront the problem.

The assignment process begins with an applicant's selection into the Marine Corps and subsequent classification as an 03XX recruit. It ends with successful completion of infantry training school. Personnel losses that occur prior to completion of a Marine's first enlistment are termed losses due to attrition. Attrition rates for infantry MOS Marines are examined and contrasted with other MOSs. Because the infantry MOS fields have such a high rate of attrition prior to fulfillment of the initial contract, the idea is introduced that there is an assignment problem at the present time. This problem will be magnified with the integration of women into infantry MOSs if the Canadian experience serves as an accurate model. To prevent this from occurring and to decrease current attrition rates, the Marine Corps needs to identify a better method of selection of personnel to 03XX MOSs. Thus, the Marine Corps warrior ethos is analyzed in search of predictors

that can be used to better "fit" the right person into Marine Corps infantry specialties.

A statistical analysis of gender differences in the GT and MM composites of the ASVAB is presented. Given the CNA study that MM is a better predictor than GT of successful performance in the infantry, the concept will be introduced that women will be at a disadvantage if accessed into the 03XX field based solely on GT score. Last, the concepts of successive selection, multiple hurdles, and predictor-criterion relationship will be defined. These concepts will form the basis for recommendations in Chapter V to better select and assign personnel into the infantry occupational fields.

B. MARINE CORP SELECTION AND ASSIGNMENT

In Fiscal Year 1993 the Marine Corps accessed 6884 recruits into infantry military occupational specialties. These specialties include rifleman (0311), Light Armored Vehicle (LAV) crewman (0313), machinegunner (0331), mortarman (0341), assaultman (0351) and anti-tank assault guided missile man (0352). Table 14 lists minimum requirements for being assigned an 03XX MOS. As Table 14 demonstrates, an applicant with a minimum GT of 80 is "qualified" to be an infantryman, machinegunner, or mortarman. The standards nominally increase for those desiring to be LAV crewman or antitank missile men--the minimum GT rises to 90, vision must be no worse than

20/200, correctable to 20/20 and a current driver's license is required. The first stop of the 03XX is recruit depot training at either San Diego or Parris Island. After "boot camp" the Marine then proceeds to Infantry Training School at Camp Lejeune, North Carolina or Camp Pendleton, California. If successful here, the Marine receives orders to his first permanent command, which is usually a Fleet Marine Force unit.

C. ATTRITION RATES

Attrition is the loss of enlisted personnel prior to completion of the first term of enlistment. For the cohort that entered the Marine Corps in fiscal year 1984, forty-two percent of women Marines and twenty-six percent of male Marines failed to complete their first term of enlistment (Department of Defense, 1988, p. 63). This combined rate of over 30 percent attrition of first-termers has been consistent in the successive years through fiscal year 1993.

Table 15 provides attrition rates and percentages of the original cohort who stay, by bi-annual period, of infantry recruits who entered the Marine Corps in fiscal year 1989. Period 1 is substantially higher than other periods because it includes basic training where attrition is 12.39 percent.

As of 14 January 1994 there were 03XX enlisted personnel on active duty in the United States Marine Corps. This MOS is the largest in terms of numbers in the Marine Corps. After infantry, the following occupational specialties rank two

through five in order of enlisted population--communications (25XX), motor transportation (35XX), personnel/administration (01XX) and engineering (13XX). Tables 16, 17, 18 and 19 provide attrition rates and percentages of the original cohort who stay, by bi-annual period, for these MOS recruits who entered the Marine Corps in fiscal year 1989. As with the infantry breakdown, Period 1 is high because of basic training losses.

Attrition rates for the above identified MOSs range 35 to 38 percent compared to more than 40 percent for infantry MOSs. This high rate of attrition points to a problem in selection in all of these job specialties. However, even more of a problem exists for the 03XX field when considering where attrition occurs. Examination at the eighteen month point (end of period 3) reveals that the 03XX MOS lost more than 25 percent of its cohort to attrition compared to the other MOSs that lose from 17 to 19 percent to attrition. After considering that all MOSs lose 12.39 percent at basic training, this equates to the 03XX MOS attriting close to 50 percent more of its initial entry force during their first year and a half on active duty than the other analyzed MOSs. This "front end" loss of personnel results in wasted training funds and impacts accession targets by forcing recruiters to fill slots that have resulted from attrition. Its effect on those who have failed to meet their contractual obligation is difficult to gauge. However, it is likely that those who do

not "measure up" have a loss of self esteem and may have problems finding employment after returning to the civilian sector because of their early termination from the Marine Corps.

Women in the Marine Corps and the Army have consistently higher rates of attrition than women in the Air Force and the Navy (Table 20). Though this could be attributed to a variety of factors, one possibility is that these two services employ women in more "non-traditional" roles when compared with the Air Force and the Navy. If this does affect attrition, women entering infantry MOSs could cause drastic inflation of the attrition rates unless a better process of selection is available to access those best qualified for infantry training.

The current attrition rates in the infantry MOSs, especially those losses occurring early in the service term, highlight the need for a better selection process. This improved assignment process would serve to improve the current force and would be in place to "fit" the best qualified person to the infantry field regardless of gender.

D. THE WARRIOR ETHOS

Major General G.A. Deegan writes that "the development of a successful warrior is hard to describe--it is much more a state of mind than it is physical abilities or knowledge" (Marine Corps Gazette, Sept. 1992, p. 42). He further states

that "no amount of education or logic will cause a young Marine to attack an enemy position. They don't deliberately think about it-it just happens. In many ways the warrior spirit is like a cult". Deegan likens this warrior spirit to "confidence that they can carry on in the face of impossible odds". This confidence, in part results from "a feeling of physical strength and superiority over the enemy."

The warrior spirit embodies sacrifice, courage, confidence, physical and emotional strength, the ability to bond with others in the pursuit of a common goal and a litany of other characteristics. In short, it is something like the cult as described by Deegan. Is it possible to define predictors for a criterion that is itself difficult to define? At this point criteria need to be defined in conceptual versus actual terminology. A conceptual criterion, as defined by Muchinsky, is a theoretical construct, an abstract idea that can never be measured. It is an ideal set of factors that constitute a successful person. However, since conceptual criterion are theoretical abstractions there needs to be a way to transpose them into "measurable, real factors." This is accomplished through the use of actual criteria. For example, two conceptual criteria for a successful college student might be intellectual growth and emotional growth. Actual criteria used to measure these two conceptual criteria could be grade point average and an advisor's rating of emotional maturity.

Though there is no way to measure, in the absence of actual combat, such concepts as emotional or physical courage that are undoubtably attributes of a warrior, tests can measure an individual's physical capacity and level of aggressiveness. While there will be less than 100 percent validity and reliability in translating these measurements to combat proficiency, a Marine infantryman must be capable of "locating, seeking out, closing with, and destroying the enemy by fire and maneuver." (Marine Corps Institute, 1985, p. 4) If lacking necessary physical capabilities, a Marine could fail in any or all four of the above areas. If lacking aggressiveness, though capable of defending himself and his unit in defensive actions, a Marine may lack what is required in offensive engagements.

Currently Marine Corps enlistment selection standards for infantry personnel do not measure the applicant's physical abilities or personality traits. Only a cognitive measure is used as a qualifier, and no MOSs have a lower standard than that used for infantry option Marines. The "cutting edge" of the Marine Corps has been and is the infantryman on the "pointed end of the sword." Is there a better way to select a force of "warriors" than is currently in place? Are current selection procedures adequate to assimilate women into infantry positions?

E. ASVAB COMPARISONS BY GENDER

As detailed in the previous chapter, the MM composite of the ASVAB test was determined to be a better predictor of an individual's ability to successfully accomplish infantry job standards than the GT composite. Figures 6 and 7 provide a comparison of how males and females score on these two composites. The scores used are all male sergeants and below currently serving in 03XX MOSs on active duty and all female Marine sergeants and below regardless of MOS currently serving on active duty.

As Figure 6 illustrates the gender GT composite results are very similar. However, males tend to score higher on the MM composite as indicated by Figure 7. The mean and standard deviation for males on the MM composite are 106.1 and 7.86 compared with the females mean and standard deviation of 95.26 and 10.64. Failure to consider this difference could lead to the average female starting out at a disadvantage when compared with the average male in infantry training.

F. CONCEPTS IMPACTING PERSONNEL DECISIONS

1. Successive Selection Strategy. Contrasted with vocational guidance strategy and pure selection strategy, successive selection strategy allows for both the individual and the organization's needs to be met. Vocational guidance attempts to match the individual with his or her wants or preferences. An example is an individual's choice of what

major to pursue upon entering college. The decision is made by the individual not by the institution. Pure selection strategy is at the other extreme in that it maximizes the organization's, and not the individual's, values. This strategy places only the most qualified people in a job. This results in highly qualified employees but many applicants who are not employed and an organization that may have gaps in its work force because it is hiring only the "best" personnel. Successive selection strategy is a compromise between vocational guidance and pure selection strategy. In this method, all jobs are filled by at least minimally qualified people. Given the available jobs, people are placed in those that will make the best use of their talents (Muchinsky, 1993, p.175).

2. Multiple hurdles. In the multiple-hurdle strategy, applicants must get satisfactory scores on a number of predictor variables (or hurdles) that are administered over time (Muchinsky, 1993, p. 167). This strategy is used for assignment to jobs whose significance to an organization "warrants an extensive selection program." The Marine Corps' "hurdles" for assignment into infantry specialties are minimal as discussed previously. Because the infantry is the "cutting edge" of the Corps, there should be a better system in place with more realistic hurdles to select and assign the best applicants to these front-line positions.

3. Predictor-Criterion Relationship. Unless a predictor

has perfect validity, there will always be mistakes made in the selection and assignment process. The goal of that process should be to make as few mistakes as possible. Through the use of a scatterplot using criterion and predictor axis, a picture will emerge of where mistakes are made in the selection procedure. Figure 8 shows the predictor-criterion relationship using only the criterion cutoff. The criterion cutoff is the point that separates successful (above) from unsuccessful (below) employees (Muchinsky, 1993, p.158). The organization determines what is successful or unsuccessful performance.

Figure 9 shows the predictor-criterion relationship using only the predictor cutoff. The predictor score is the point that separates accepted (right) from rejected (left) applicants (Muchinsky, 1993, p.158).

Figure 10 combines the predictor and criterion cutoffs and forms four quadrants that are composed of four groups of people. Each group is identified by a letter.

Personnel grouped in quadrant A are to the right of the predictor cutoff and above the criterion cutoff. These are people who met all predictor tests, were hired and became successful employees. Personnel in this group are designated as true positives.

Personnel grouped in quadrant B are to the left of the predictor cutoff and below the criterion cutoff. These are people who did not pass the predictor tests, were not hired

and would have been deemed unsuccessful employees if they had been hired. Personnel in this group are designated as true negatives.

Personnel grouped in quadrant C are to the left of the predictor cutoff but above the criterion cutoff. These are people who failed the predictor tests, were not hired but if they had been hired would have been successful employees. Personnel in this group are designated as false negatives.

Personnel grouped in quadrant D are to the right of the predictor cutoff but below the criterion cutoff. These are people who passed the predictor tests, were hired but who are performing their jobs unsatisfactorily. Personnel in this group are designated as false positives.

The prevailing attrition rate of 03XX Marines indicates that the Marine Corps has a problem with "false positive" personnel. Simply moving the predictor cutoff to the right will result in less false positives but more false negatives. The key to reducing both types of selection errors is to increase the validity of the predictor(s). The greater the validity of the predictor, the smaller the chance that people will be mistakenly classified (Muchinsky, 1993, p. 160). This points to the Marine Corps' use of the GT composite as the primary predictor of successful 03XX performance as being lacking.

The Army's attempt to use a physical predictor prior to assignment into a job specialty has been previously

documented. The Marine Corps' use of only a cognitive predictor is reinforced by the many studies that seek to demonstrate the superiority of cognitive ability tests in predicting job performance. However, Day and Silverman write that personality variables can be significant predictors of job performance when carefully matched with the appropriate occupation and organization. A contrast is drawn between a fireman's job and an accountant's job. While use of a cognitive predictor might make a significant contribution to successful performance of both jobs, personality traits that are important for success as an accountant are unlikely to be the same ones demonstrated by successful firefighters. Given a large pool of personality variables, different sets of variables will be relevant to distinct types of occupations (Day and Silverman, 1989, p.26). Day and Silverman conclude:

> There is a place for personality measures when they are properly matched to a particular occupation and organization. Incorporating personality measures along with cognitive ability may enhance the prediction of job performance through their incremental validity by improving on the base rate of a selection strategy. Choosing work-related personality measures on the basis of information gathered from a thorough job and organizational analysis can help improve employee selection. The contribution of personality in shaping who tends to perform well or remain in an organization should not be overlooked. (Day and Silverman, 1989, p.35)

G. SUMMARY

This chapter has identified the current selection and assignment process that the Marine Corps uses to fill its

infantry MOSs. It has also identified the high rates of attrition of first term Marines assigned to infantry MOSs. It attempts to show that the process needs to be re-evaluated now to circumvent personnel and monetary losses due to early attrition. This attrition rate will increase when women are granted entry into infantry MOSs if the Canadian model serves as a correct example. While maintaining a cognitive predictor such as the MM composite as one predictor, there are other strategies such as successive selection and multiple hurdles that could be employed to provide a better "fit" between potential Marines and the infantry MOSs.

V. RECOMMENDATIONS

A. SUMMARY AND RECOMMENDATIONS

Currently women do not serve in job specialties that fall under the new definition of direct combat. However, it is not unrealistic to assume that at some future point the services will be required to fill all jobs with the best person with no regard to gender. Because of the physical, aggression level and cognitive differences separating the average male and the average female, attrition problems will be exacerbated unless better predictors than are currently in place are found to select and assign enlistees to the infantry MOSs.

At present the Marine Corps attrition of first-term 03XX Marines creates serious problems. Recruiters have to fill holes caused by attrition, Fleet Marine Force units are burdened with separation proceedings and the budget process is impacted because of re-training costs. A better selection process needs to be implemented now to better fit qualified males for infantry specialties and to be in place to identify and assimilate females who are capable of filling 03XX specialties. This new process should use the successive selection and multiple hurdle strategies outlined in the previous chapter.

As shown by the CNA study presented in Chapter III, the MM

composite is a better predictor than the GT composite of an individual's ability to successfully meet infantry training standards. As such, the MM composite should be used as the predictor for an applicant's cognitive ability to meet infantry job specifications. This should not be viewed as encroachment on more technical MOSs, such as aircraft maintenance, which also use MM scores for assignment. While MM would be used as a cognitive predictor for infantry MOSs, a lower MM cut-off could be set for assignment as an 03XX than for assignment as an aircraft mechanic.

A job analysis that could determine strength requirements for Marines in infantry job specialties should be undertaken. This analysis should measure what is expected from a Marine in a war scenario and not in a peacetime environment. Studies show that lean muscle mass has a direct effect on an individual's strength and aerobic capacity. As discussed in Chapter 2, the strength disparity between the genders narrows when strength is compared relative to fat-free weight. In conjunction with the job analysis measuring strength requirement, an entrance test needs to be developed that is simple, efficient and unable to be compromised. This could be an established cut-off for lean muscle mass (fat-free weight). This measurement could be obtained by taking a person's actual weight and multiplying by the person's percentage of body fat. For example, if an applicant weighs 140 pounds and has a body fat percentage of 15 percent, his lean muscle mass weight

would be 119[140-(140x15%)]. If the job analysis found that the minimum requirement to perform combat related infantry tasks, such as forced marching with combat load or manually transporting casualties, was 115 pounds of lean muscle mass, then the applicant would be over the physical hurdle for infantry assignment. If the standard was set at 120 the applicant could be assigned to another MOS or be counseled on why he or she was not qualified, told what combination of weight and body fat would be necessary for acceptance into the infantry and could return to be tested at another time.

Another hurdle that could be implemented at the recruiting station is the administration of a personality profile measurement test. This test could serve to measure an individual's aggression levels. Those with very low aggression profiles could be assigned an MOS not so attuned with the mission of the Marine infantry to seek out, close with and destroy the enemy.

Utilization of these three hurdles would fulfill the successive selection strategy that mandates that people be placed in those jobs that will best use their talents. When this occurs, both the organization and the individual's needs are met. These predictors would also increase the assignment of "true positives" and concurrently decrease the assignment of "false positives" to the infantry.

B. CONCLUSION

Most literature concerning the very controversial topic of women being assigned to combat specialties has focused on why they should be given the opportunity to fight or why they should not be tasked with this role. The question of how to assimilate women into Marine combat arms and specifically into the infantry MOSs has not been addressed. At some future time this may become a reality. This thesis has identified differences between the two genders that could impact combat readiness if the current assignment process continues to be implemented. Use of better predictors will allow the Marine Corps to better fit a qualified person into an infantry specialty. Improving the assignment process should decrease current attrition rates. Also, if rules restricting women from direct combat are changed, it will allow accession of women who are more capable of meeting infantry standards than women who would be assigned using current predictors. Failure to address this process will result in continued high attrition and will lead to the type of problems experienced by the Canadian Forces if the Marine Corps is required to assimilate women into combat arms.

APPENDIX A

Table 1. OCCUPATIONAL FIELDS FOR WOMEN, PROCEDURES ANALYSIS OFFICE

01	Personnel and Administration
02	Intelligence
04	Logistics
14	Mapping
15	Printing
22	Fire Control Instrument Repair
25	Operational Communications
26	Communication Material
27	Electronics
30	Supply
31	Warehousing, Shipping, and Receiving
33	Food
34	Disbursing
35	Motor Transport
40	Machine Accounting
41	Post Exchange
43	Public Information
46	Photography
49	Training and Training Aids
52	Special Services
55	Band
66	Aviation Electronics
67	Air Control
68	Aerology
69	Aviation Synthetic Training Devices
70	Aviation Operations and Intelligence
71	Flight Equipment

Source: Stremlow, History of the Women Marines, 1986.

TABLE 2. GROUND MOS's OPENED TO FEMALE MARINES

2362 Ground Nuclear Weapons Assembly Technician
2671 Cryptologic Linguist
5720 Ground Nuclear Weapons Assembly Officer
5907 Ground Launched Missile Maintenance Officer
5907 Ground Launched Missile Maintenance Officer
5921-5929 Hawk Missile Systems Technicians
5943 Aviation Fire Control Repairer
5947 Aviation Fire Control Technician
7204 Antiair Warfare Officer
7222 Hawk Missile System Operator

Source: Marine Corps Public Affairs Office, "Questions and Answers," January 27,1994.

TABLE 3. AIR MOS's OPENED TO FEMALE MARINES

6031-6032 Aircraft Flight Engineer, KC-130
7371 Aerial Navigator Trainee
7372 First Navigator
7380 Aerial Navigation Officer
7381-7382 Airborne Radio Operator/Loadmaster
75XX Pilot/Naval Flight Officer

Source: Marine Corps Public Affairs Office, "Questions and Answers," January 27, 1994.

TABLE 4. UNITS OPENED TO FEMALE MARINES

Communications Company, Marine Division
Firing and H&S Batteries, Light Anti-Air Missile Battalions

Source: Marine Corps Public Affairs Office, "Questions and Answers," January 27, 1994.

TABLE 5. MOS's CLOSED TO WOMEN MARINES

0210	Counterintelligence Officer
0211	Counterintelligence Specialist
0250	Interrogation-Translation Officer
0251	Interrogation-Translation Specialist
03XX	Infantry
0451	Air Delivery Specialist
0481	Landing Support Specialist
08XX	Artillery
1302	Engineer Officer
1371	Combat Engineer
18XX	Tank and Assault Amphibious Vehicle
2110	Ordnance Vehicle Maintenance Officer
2131	Artillery Weapons/Turret Repairer
2141	Assault Amphibian Vehicle Repairer/Technician
2143	Self-Propelled Artillery Repairer /Technician
2145	Tracked Vehicle Repairer, Tank
2147	LAV Repairer
2149	Ordnance Vehicle Technician
2305	Explosive Ordnance Disposal Officer
2336	Explosive Ordnance Disposal Technician
6015	Aircraft Mechanic, AV-8
6038	Maintenance Specialist, AV-8
6112-6115	Helicopter Mechanic
6172-6176	Helicopter Crew Chief
7207	Forward Air Controller
7208	Air Support Control Officer
7212	Stinger Missile Gunner
7242	Air Support Operations Operator

Source: Marine Corps Order 1300.8.

TABLE 6. UNITS CLOSED TO FEMALE MARINES

Infantry Regiment and Battalion
Artillery Battalion
Reconnaissance Battalion
Force Reconnaissance Company
Tank Battalion
Assault Amphibian Battalion
LAV Battalion
LAAD Battalion
Air/Naval Gunfire Liaison Company
Combat Engineer Battalion
Marine Air Support Squadron
Counterintelligence Teams
Helicopter Squadron (tactical)
AV-8 Squadron (tactical)
Sensor Control and Management Platoons

Source: Marine Corps Order 1300.8.

Table 7. COMPARISON OF BODY COMPOSITION MEASURES FOR MALE AND FEMALE RECRUITS

	MALE	FEMALE	CHANGE
	(N=980)	(N=1003)	
MEASURE	MEAN	MEAN	
HEIGHT (IN)	68.9	96.1	-4.8
WEIGHT (LB)	160.4	128.7	-31.7
LEAN MASS (LB)	133.5	96.1	-37.4
FAT MASS (LB)	26.9	32.6	5.7
% BODY FAT	16.8	25.3	8.5

Source: Myers et al, "ARI Validation of the Military Physical Strength Capacity Test, US Army Research Institute," 1984.

Table 8. CORRELATION OF PHYSICAL PERFORMANCE AND BODY COMPOSITION

	PERCENT BODY FAT		FAT-FREE MASS	
	Men	Women	Men	Women
Maximum box lift	0.06	0.10	0.45	0.26
Two-mile run	0.51	0.42	0.01	-0.05

Source: Sharp, "Physical Fitness, Physical Training and Occupational Performance of Men and Women in the U.S. Army: A Review of Literature," 1993.

TABLE 9. USARIEM MOS PHYSICAL DEMAND CLASSIFICATION SYSTEM

MOS Cluster	Lifting Capacity	Aerobic Capacity
Alpha	>40 kg	>2.25 1/min
Bravo	>40 kg	1.5-2.25 1/min
Charlie	>40 kg	<1.5 1/min
Delta	30-40 kg	<1.5 1/min
Echo	<30kg	<1.5 1/min

Source: Teves, et al, "Performance on Selected Candidate Screening Test Procedures Before and After Army Basic and Advanced Individual Training," 1985.

TABLE 10. MODIFIED DOL PHYSICAL DEMAND CLASSIFICATION SYSTEM

	Occasional Lifting	Frequent Lifting
	(<20% of time)	(20%<of time<80%)
Light	20 lb	10 lb
Medium	50 lb	25 lb
Moderately Heavy	80 lb	40 lb
Heavy	100 lb	50 lb
Very Heavy	100 lb	>100 lb

Source: Teves, et al, "Performance on Selected Candidate Screening Test Procedures Before and After Army Basic and Advanced Individual Training," 1985.

TABLE 11. ASVAB SUBTESTS

Subtest	Minutes/Items	Description
General Science (GS)	11/25	Measures knowledge of physical and biological sciences.
Arithmetic Reasoning (AR)	36/30	Measures ability to solve word problems.
Word Knowledge (WK)	11/35	Measures ability to select correct meaning of words presented in context and to identify synonyms for a word.
Paragraph Comprehension (PC)	13/15	Measures ability to obtain information from written passages.
Numerical Operations (NO)	3/50	Measures ability to perform arithmetic computations in a speeded context.
Coding Speed (CS)	7/84	Measures ability to assign code numbers in a speeded context.
Auto/Shop Information (AS)	11/25	Measures knowledge of automobiles, tools, and shop terminology and practices.
Mathematics Knowledge (MK)	24/25	Measures knowledge of high school math principles.
Mechanical Comprehension (MC)	19/25	Measures knowledge of mechanical and physical principles and ability to visualize how illustrated object works.
Electronics Information (EI)	9/20	Measures knowledge of electricity and electronics.

Source: DoD, ASVAB Counselor's Manual, 1989.

TABLE 12. MOSs WITH SAMPLE SIZE

MOS	DESCRIPTION	SAMPLE SIZE
0311	Rifleman	940
0331	Machinegunner	271
0311	Mortarman	253
0351	Assaultman	277
0369	Inf. unit leader	387

Source: Mayberry and Carey, "Relationship Between ASVAB and Mechanical Maintenance Job Performance," 1993.

TABLE 13. VALIDITIES FOR APTITUDE COMPOSITES AGAINST HANDS-ON TEST

MOS	GT	MM	EL	CL
Sample Values				
0311	.47	.52	.46	.34
0341	.53	.54	.56	.43
0341	.43	.55	.45	.25
0351	.42	.45	.46	.32
0369	.45	.49	.47	.43
Corrected Values				
0311	.60	.69	.61	.51
0341	.70	.70	.72	.62
0341	.45	.60	.45	.30
0351	.54	.54	.53	.41
0369	.60	.60	.59	.51

Source: Mayberry and Carey, "Relationship Between ASVAB and Mechanical Maintenance Job Performance," 1993.

TABLE 14. PREREQUISITES FOR ASSIGNMENT TO INFANTRY OPTION

MOS	Vision	License,Driver	Minimum GT
0311	NA	NA	80
0313	20/200,20/20	Current	90
0331	NA	NA	80
0341	NA	NA	80
0351	20/200,20/20	Current	80
0352	20/200,20/20	NA	90

Source: Marine Corps Order 1130.53L.

Table 15. MOS 03XX ATTRITION RATES, FY 1989 COHORT

Period	1	2	3	4	5	6	7
ATT %	14.61	7.71	5.51	4.59	5.28	6.15	6.41
STAY %	85.39	78.81	74.47	71.05	67.30	63.16	59.11

Source: Derived from data provided by Headquarters Marine Corps, Manpower Analysis Branch.

Table 16. MOS 25XX ATTRITION RATES, FY 1989 COHORT

Period	1	2	3	4	5	6	7
ATT %	12.55	1.49	3.67	5.02	5.48	6.82	6.81
Stay %	87.45	86.15	82.99	78.82	74.50	69.42	64.69

Source: Derived from data provided by Headquarters Marine Corps, Manpower Analysis Branch.

Table 17. MOS 35XX ATTRITION RATES, FY 1989 COHORT

Period	1	2	3	4	5	6	7
ATT %	12.58	1.78	3.96	5.50	5.59	6.92	7.68
Stay %	87.42	85.87	82.49	77.95	73.59	68.50	63.24

Source: Derived from data provided by Headquarters Marine Corps, Manpower Analysis Branch.

Table 18. MOS 01XX ATTRITION RATES, FY 1989 COHORT

Period	1	2	3	4	5	6	7
ATT %	13.02	3.09	4.24	4.99	5.97	6.28	5.19
Stay %	86.98	84.29	80.72	76.69	72.11	67.58	64.07

Source: Derived from data provided by Headquarters Marine Corps, Manpower Analysis Branch.

Table 19. MOS 13XX ATTRITION RATES, FY 1989 COHORT

Period	1	2	3	4	5	6	7
ATT %	13.08	2.96	3.90	4.80	6.14	7.83	7.68
Stay %	86.92	84.35	81.06	77.17	72.43	66.76	61.63

Source: Derived from data provided by Headquarters Marine Corps, Manpower Analysis Branch.

Table 20. FEMALE ATTRITION BY SERVICE

	COHORT			
	FY84	FY85	FY86	FY87
ARMY	.40	.37	.38	.37
USMC	.42	.46	.46	.46
NAVY	.25	.29	.29	.29
AIR FORCE	.26	.28	..28	.29

Source: OSD, Officer/Enlisted Personnel Directorate.

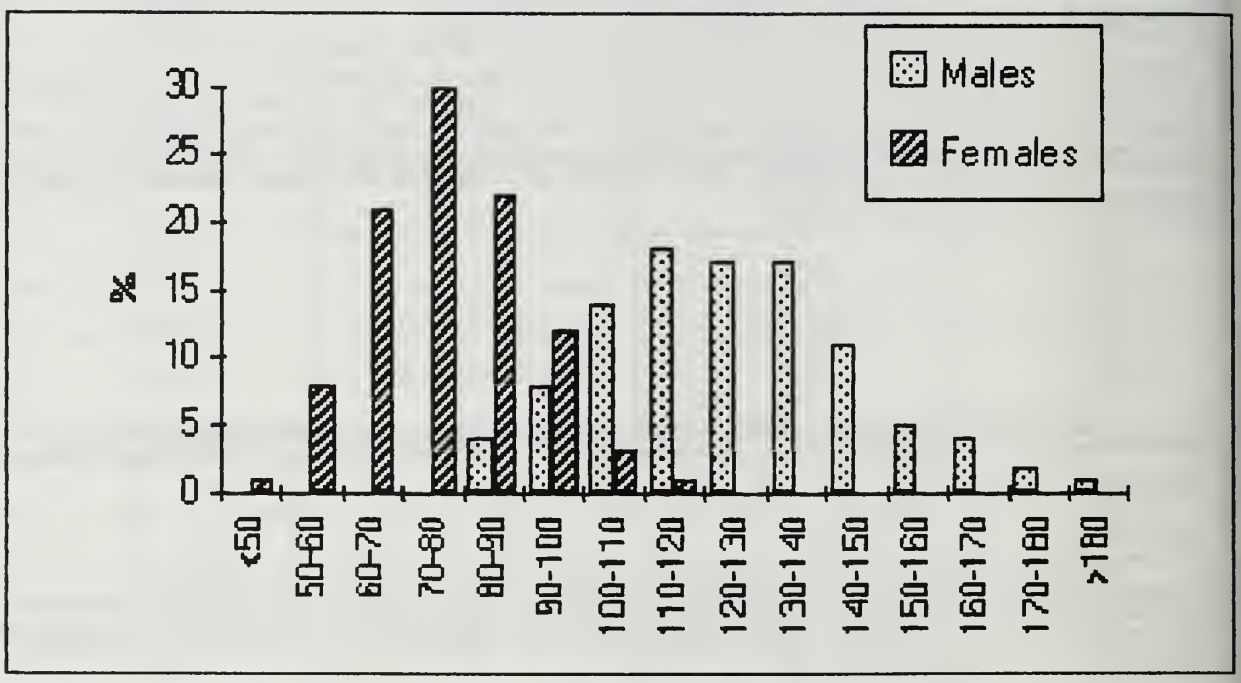

Figure 1. Isometric Lifting Strength of Men and Women

Source: Park, "Physical Fitness, Physical Training and Occupational Performance of Men and Women in the U.S. Army," 1993.

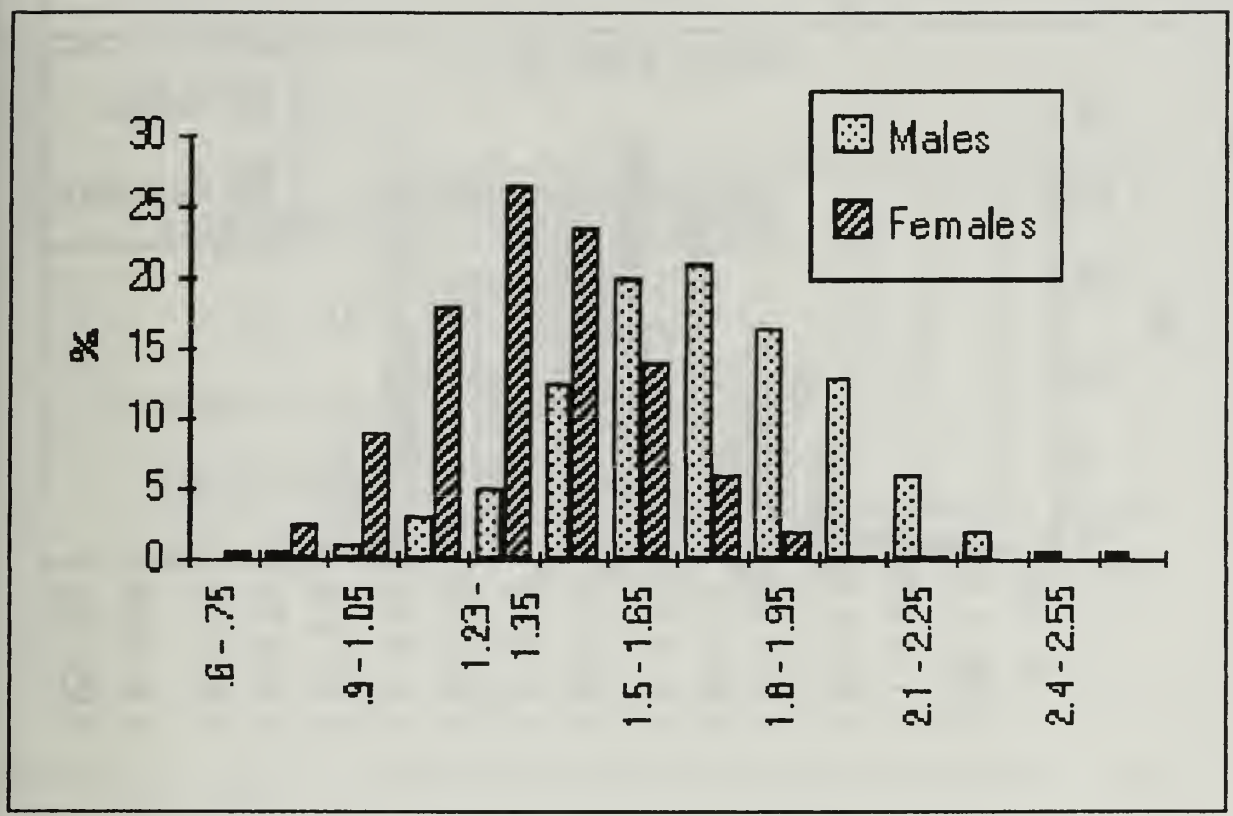

Figure 2. Isometric Lifting Strength of Men and Women Relative to Body Weight

Source: Park, "Physical Fitness, Physical Training and Occupational Performance of Men and Women in the U.S. Army," 1993.

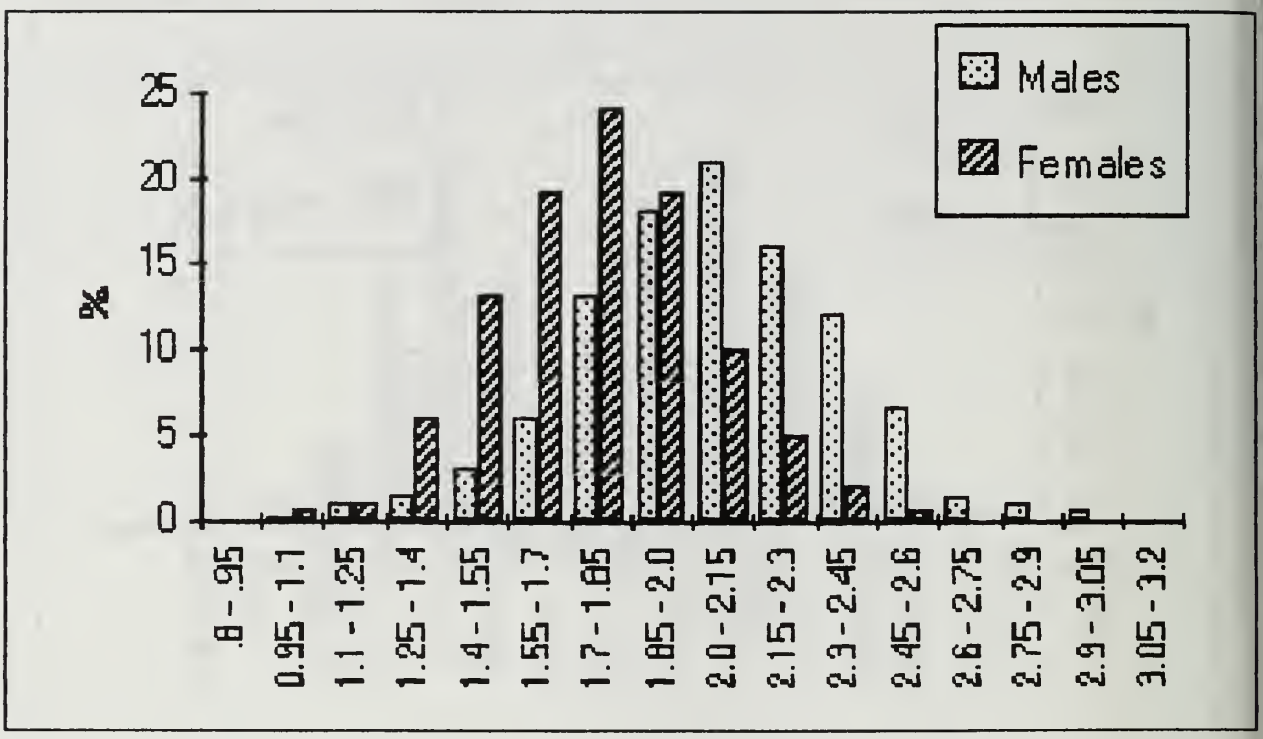

Figure 3. Isometric Lifting Strength of Men and Women Relative to Fat-Free Weight

Source: Parks, "Physical Fitness, Physical Training and Occupational Performance of Men and Women in the U.S. Army," 1993.

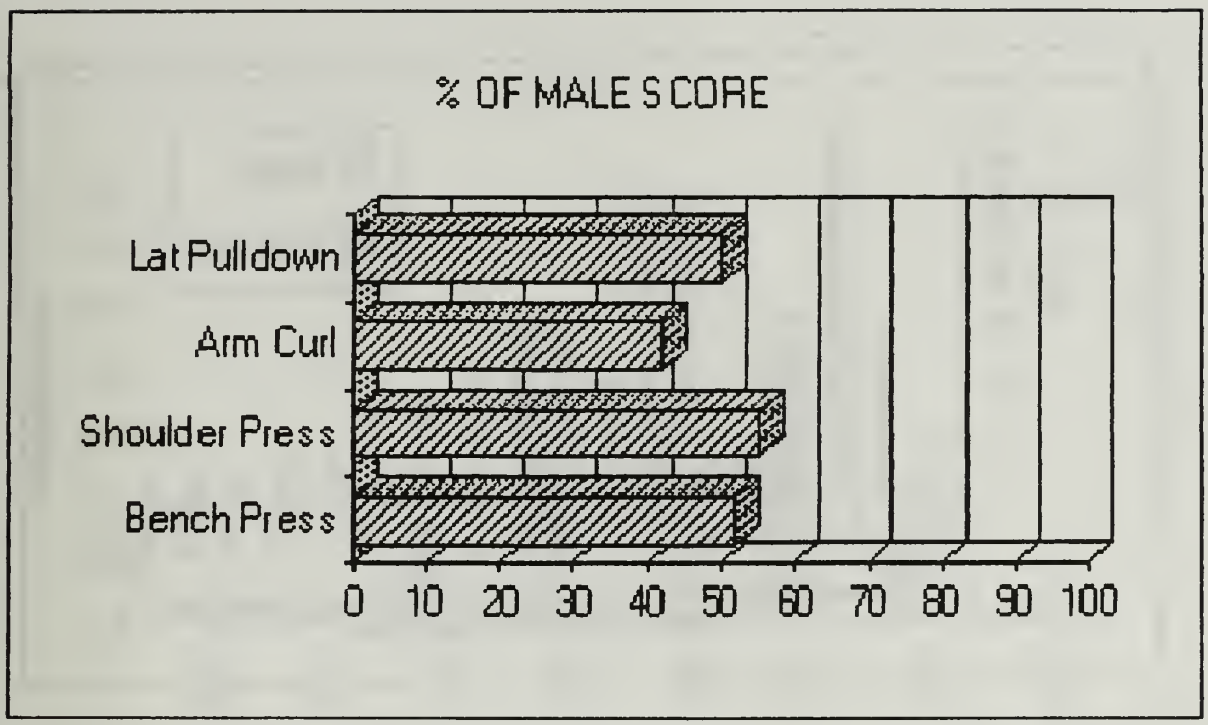

Figure 4. Upper Torso Muscular Strength Scores for Navy Women

Source: Presidential Commission, Report to the President, 1992.

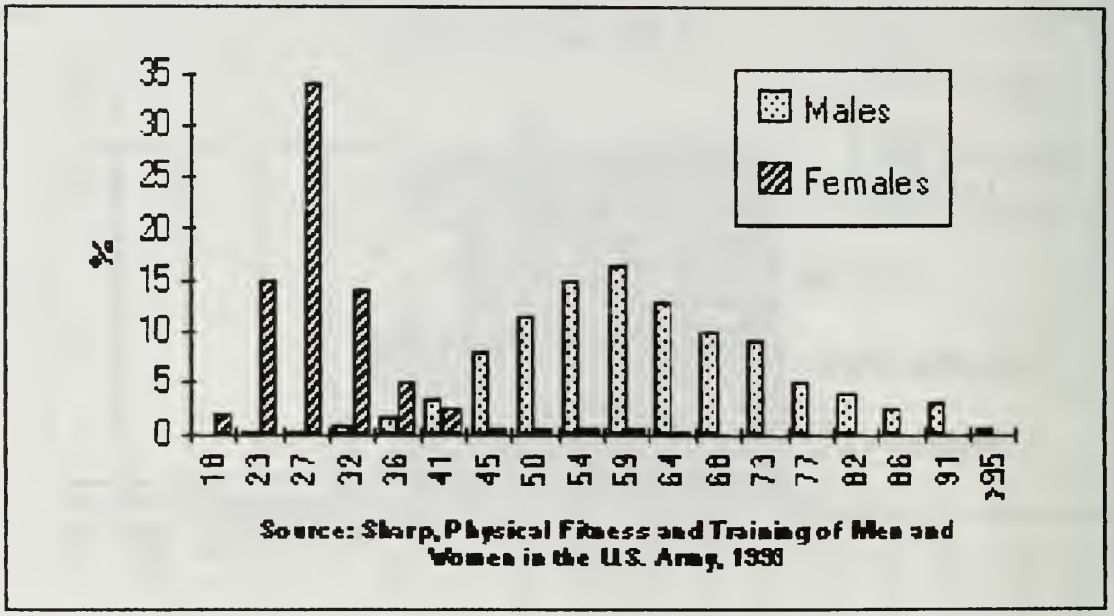

Figure 5. Maximum Lifting Strength (KG)

Source: Sharp, Physical Fitness and Training of Men and Women in the U.S. Army, 1993.

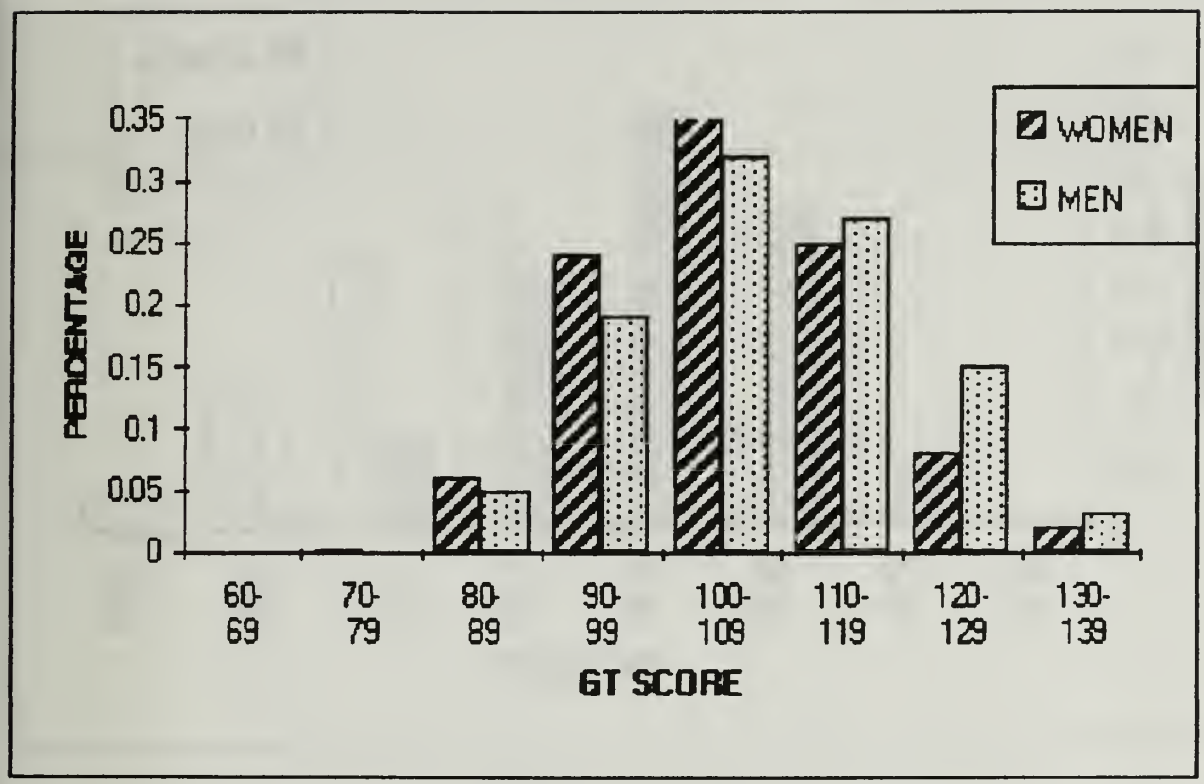

Figure 6. Gender GT Composite Comparisons

Source: Derived from data provided by Defense Manpower Data Center

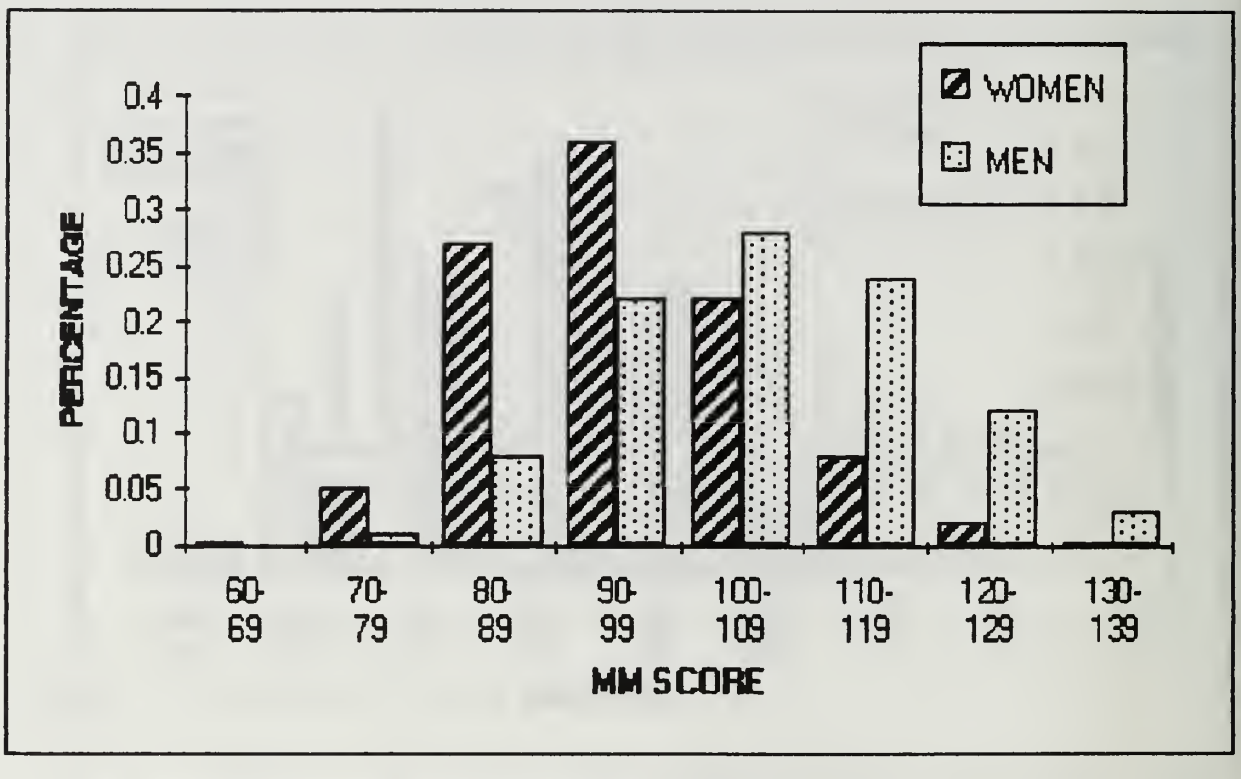

Figure 7. Gender MM Composite Comparisons

Source: Derived from data provided by Defense Manpower Data Center

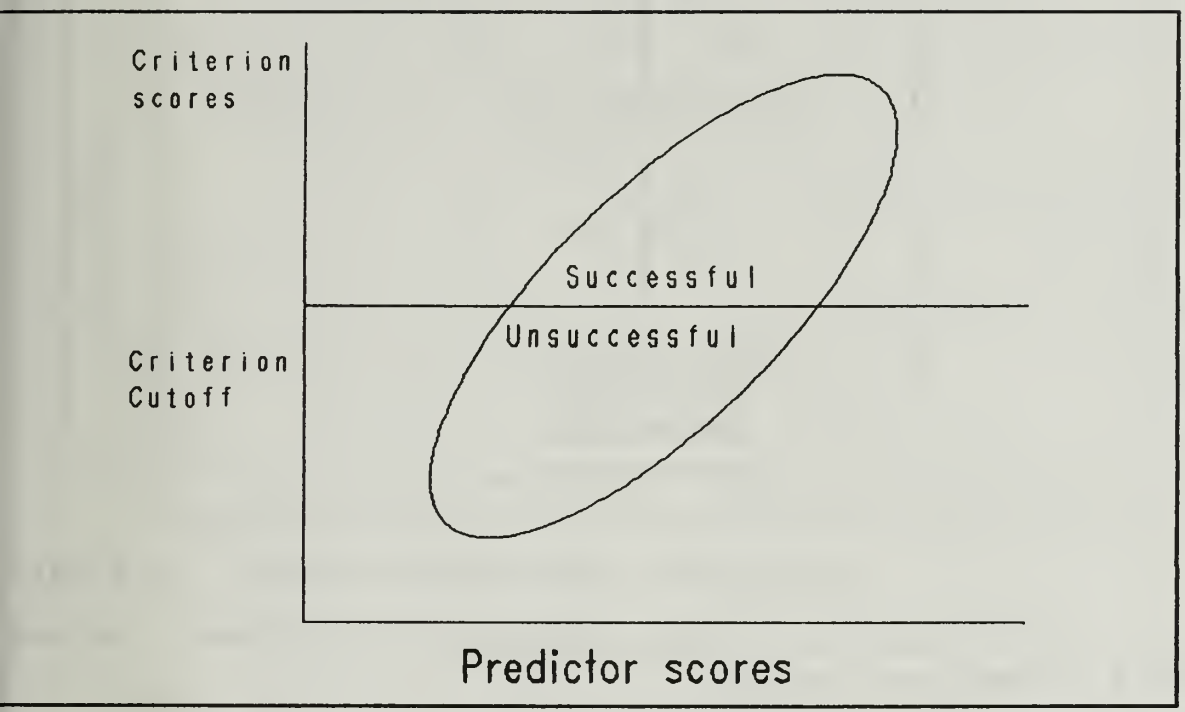

Figure 8. Criterion Cutoff

Source: Muchinsky, Psychology Applied to Work, 1993

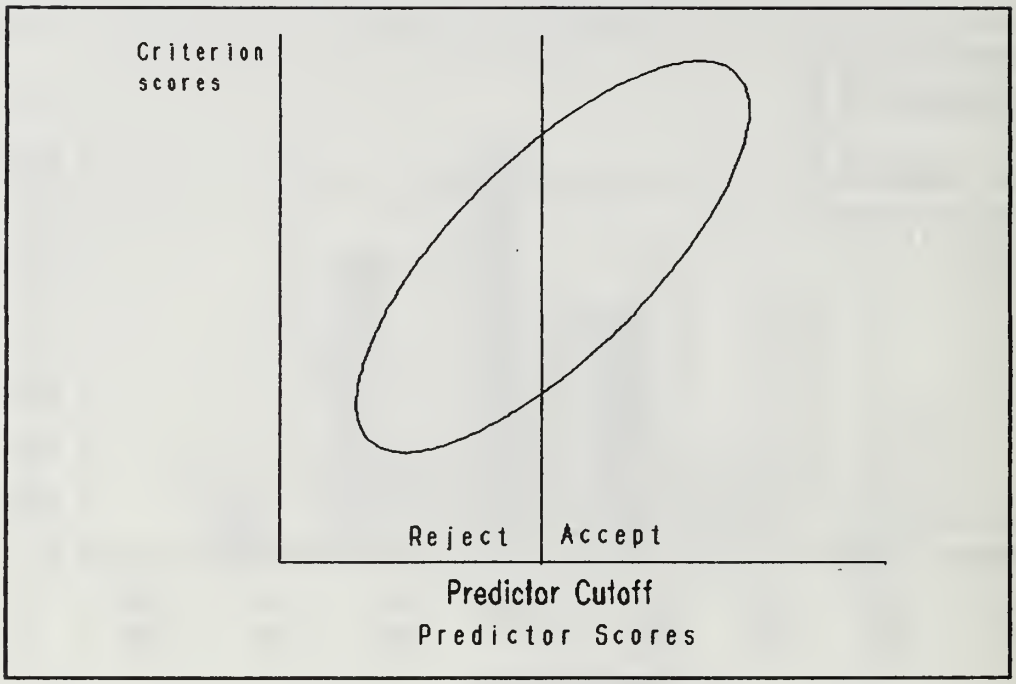

Figure 9. Predictor Cutoff

Source: Muchinsky, Psychology Applied to Work, 199

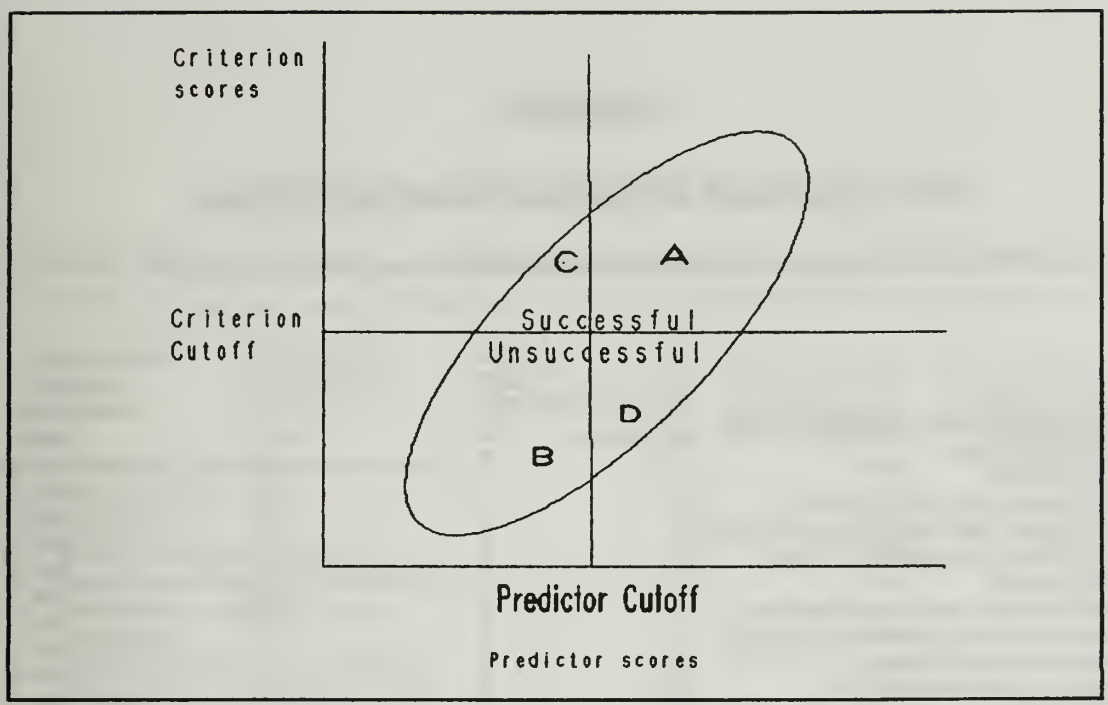

Figure 10. Criterion-Predictor Relationship

Source: Muchinsky, Psychology Applied to Work, 1993.

Appendix C

Occupational Fields for Women Officers

Occupational fields in which women officers are eligible to serve, and percentages in each, as of 31 December 1976.

		NO. WOMEN OFFICERS	PERCENTAGE OF WOMEN OFFICERS	PERCENTAGE OF USMC OFFICERS
01	PERSONNEL AND ADMINISTRATION	142	33.41	30.80
02	INTELLIGENCE	18	4.23	9.42
04	LOGISTICS	0	0.00	0.00
13	ENGINEER AND SHORE PARTY	4	0.94	0.56
14	DRAFTING, SURVEYING, AND MAPPING	0	0.00	0.00
15	PRINTING AND REPRODUCTION	0	0.00	0.00
21	ORDNANCE	0	0.00	0.00
23	EXPLOSIVES ORDNANCE DISPOSAL	0	0.00	0.00
25	OPERATIONAL COMMUNICATIONS	20	4.70	2.22
26	SIGNALS INTELLIGENCE	0	0.00	0.00
28	TELECOM MAINTENANCE	0	0.00	0.00
30	SUPPLY ADMINISTRATION/OPERATIONS	28	6.59	2.25
31	TRANSPORTATION	5	1.17	16.67
32	REPAIR SERVICES	0	0.00	0.00
33	FOOD SERVICES	8	1.90	28.51
34	AUDITING, FINANCE, AND ACCOUNTING	46	10.80	21.00
35	MOTOR TRANSPORT	6	1.40	4.41
40	DATA SYSTEMS	18	4.23	6.47
41	MC EXCHANGE	12	2.82	44.44
43	PUBLIC AFFAIRS	14	3.29	35.90
44	LEGAL SERVICES	26	6.11	5.21
46	PHOTOGRAPHY	5	1.17	5.26
49	TRAINING AND TRAINING AIDS	3	0.70	17.65
55	BAND	0	0.00	0.00
57	NUCLEAR, BIOLOGICAL, CHEMICAL	0	0.00	0.00
58	MILITARY POLICE	5	1.15	5.26
59	ELECTRONICS MAINTENANCE	1	0.23	0.71
60	AIRCRAFT MAINTENANCE	4	0.97	1.98
65	AVIATION ORDNANCE	0	0.00	0.00
66	AVIONICS	0	0.00	0.00
68	WEATHER SERVICE	3	0.70	21.43
70	AVIATION OPERATIONS	1	0.23	4.17
72	AIR CONTROL/SUPPORT/ANTIAIR WARFARE	9	2.11	1.61
73	AIR TRAFFIC CONTROL	13	3.05	13.40
99	IDENTIFYING AND REPORTING MOSs	34	8.00	3.01

Appendix D

Occupational Fields for Enlisted Women

Occupational fields in which enlisted women were eligible to serve, and percentages in each, as of 31 December 1976.

		NO. WOMEN MARINES	PERCENTAGE OF ENLISTED WOMEN	PERCENTAGE OF ENLISTED MARINES
01	PERSONNEL AND ADMINISTRATION	950	30.42	9.05
02	INTELLIGENCE	4	0.12	0.33
04	LOGISTICS	22	0.70	1.84
13	ENGINEER AND SHORE PARTY	31	0.99	0.37
14	DRAFTING, SURVEYING, AND MAPPING	5	0.16	1.59
15	PRINTING AND REPRODUCTION	14	0.44	6.90
21	ORDNANCE	2	0.06	0.07
23	EXPLOSIVES ORDNANCE DISPOSAL	0	0.00	0.00
25	OPERATIONAL COMMUNICATIONS	155	4.96	1.21
26	SIGNALS INTELLLIGENCE	0	0.00	0.00
28	TELECOM MAINTENANCE	166	5.31	4.11
30	SUPPLY ADMINISTRATION/OPERATIONS	443	14.18	3.87
31	TRANSPORTATION	69	2.21	8.59
32	REPAIR SERVICES	8	0.25	2.60
33	FOOD SERVICES	16	0.51	0.39
34	AUDITING, FINANCE, AND ACCOUNTING	139	4.45	8.17
35	MOTOR TRANSPORT	186	5.95	1.41
40	DATA SYSTEMS	101	3.23	6.18
41	MC EXCHANGE	75	2.40	12.02
43	PUBLIC AFFAIRS	53	1.69	15.19
44	LEGAL SERVICES	91	2.99	16.98
46	PHOTOGRAPHY	19	0.60	4.52
49	TRAINING AND TRAINING AIDS	47	1.50	14.78
55	BAND	39	1.24	3.76
57	NUCLEAR, BIOLOGICAL, CHEMICAL	0	0.00	0.00
58	MILITARY POLICE	90	2.88	2.12
59	ELECTRONICS MAINTENANCE	1	0.03	0.05
60	AIRCRAFT MAINTENANCE	13	0.41	0.12
65	AVIATION ORDNANCE	0	0.00	0.00
66	AVIONICS	57	1.84	0.81
68	WEATHER SERVICE	22	0.70	7.24
70	AVIATION OPERATIONS	25	0.80	1.27
72	AIR CONTROL/SUPPORT/ANTIAIR WARFARE	0	0.00	0.00
73	AIR TRAFFIC CONTROL	15	0.48	1.86
99	IDENTIFYING AND REPORTING MOS's	226	7.23	2.44

Appendix E

Occupational Fields for Women Officers

Occupational fields in which women officers were eligible to serve, and percentages in each, as of 25 January 1994.

		NO. WOMEN OFFICERS	PERCENTAGE OF WOMEN OFFICERS	PERCENTAGE OF USMC MARINES
01	PERSONNEL AND ADMINISTRATION	146	22.96	22.57
02	INTELLIGENCE	27	4.24	4.60
04	LOGISTICS	37	5.82	3.90
11	UTILITIES	2	0.31	4.26
13	ENGINEER AND SHORE PARTY	0	0.00	0.00
15	PRINTING AND REPRODUCTION	0	0.00	0.00
18	TANK AND ASSAULT VEHICLES	0	0.00	0.00
21	ORDNANCE	4	0.63	2.70
23	EXPLOSIVES ORDNANCE DISPOSAL	2	0.31	1.92
25	OPERATIONAL COMMUNICATIONS	41	6.45	6.48
26	SIGNALS INTELLIGENCE	21	3.30	8.64
28	TELECOM MAINTENANCE	10	1.57	7.40
30	SUPPLY ADMINISTRATION/OPERATIONS	42	6.60	6.58
31	TRANSPORTATION	6	0.94	10.00
33	FOOD SERVICES	4	0.63	9.09
34	AUDITING, FINANCE, AND ACCOUNTING	50	7.86	14.41
35	MOTOR TRANSPORT	23	3.62	5.40
40	DATA SYSTEMS	28	4.40	9.50
41	MC EXCHANGE	4	0.63	7.7
43	PUBLIC AFFAIRS	17	2.67	22.67
44	LEGAL SERVICES	33	5.19	7.15
46	PHOTOGRAPHY	4	0.63	10.53
55	BAND	1	0.16	5.88
57	NUCLEAR, BIOLOGICAL, CHEMICAL	0	0.00	0.00
58	MILITARY POLICE	13	2.04	7.50
59	ELECTRONICS MAINTENANCE	0	0.00	0.00
60	AIRCRAFT MAINTENANCE	21	3.30	6.00
63	AVIONICS	0	0.00	0.00
65	AVIATION ORDNANCE	0	0.00	0.00
66	AVIATION SUPPLY	14	2.20	5.15
68	WEATHER SERVICE	0	0.00	0.00
70	AVIATION OPERATIONS	0	0.00	0.00
72	AIR CONTROL/SUPPORT/ANTIAIR WARFARE	12	1.89	2.20
73	AIR TRAFFIC CONTROL	13	2.04	9.42
99	IDENTIFYING AND REPORTING MOS's	59	9.28	3.61

Appendix F

Occupational Fields for Enlisted Women

Occupational fields in which enlisted women were eligible to serve, and percentages in each, as of 25 January 1994.

		NO. ENLISTED WOMEN	PERCENTAGE OF ENLISTED WOMEN	PERCENTAGE OF ENLISTED MARINES
01	PERSONNEL AND ADMINISTRATION	1562	21.68	16.54
02	INTELLIGENCE	58	0.80	4.08
04	LOGISTICS	187	2.60	5.59
11	UTILITIES	143	1.98	4.59
13	ENGINEER AND SHORE PARTY	153	2.12	2.05
15	PRINTING AND REPRODUCTION	25	0.35	18.52
18	TANK AND ASSAULT VEHICLES	0	0.00	0.00
21	ORDNANCE	44	0.61	1.27
23	EXPLOSIVES ORDNANCE DISPOSAL	43	0.60	2.77
25	OPERATIONAL COMMUNICATIONS	350	4.86	3.35
26	SIGNALS INTELLLIGENCE	79	1.10	4.61
28	TELECOM MAINTENANCE	116	1.61	3.18
30	SUPPLY ADMINISTRATION/OPERATIONS	884	12.27	11.40
31	TRANSPORTATION	116	1.61	17.29
33	FOOD SERVICES	313	4.34	8.74
34	AUDITING, FINANCE, AND ACCOUNTING	215	2.98	15.14
35	MOTOR TRANSPORT	419	5.82	3.67
40	DATA SYSTEMS	123	1.71	9.27
41	MC EXCHANGE	24	0.33	14.63
43	PUBLIC AFFAIRS	88	1.22	26.83
44	LEGAL SERVICES	135	1.87	25.23
46	PHOTOGRAPHY	77	1.07	14.31
55	BAND	90	1.25	14.38
57	NUCLEAR, BIOLOGICAL, CHEMICAL	15	0.21	2.41
58	MILITARY POLICE	194	2.69	5.13
59	ELECTRONICS MAINTENANCE	51	0.71	3.35
60	AIRCRAFT MAINTENANCE	284	3.94	3.60
63	AVIONICS	81	1.12	2.57
65	AVIATION ORDNANCE	112	1.55	4.54
66	AVIONICS	248	3.44	12.90
68	WEATHER SERVICE	23	0.32	8.85
70	AVIATION OPERATIONS	165	2.29	7.22
72	AIR CONTROL/SUPPORT/ANTIAIR WARFARE	11	0.15	0.84
73	AIR TRAFFIC CONTROL	68	0.94	6.52
99	IDENTIFYING AND REPORTING MOS's	503	6.98	3.76

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